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Computer simulation model of soil water movement and uptake by plant roots

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ABSTRACT

A computer simulation model is presented of soil water movement and uptake by plant roots including the computer software package which implements the model. The flow of soil water is assumed to satisfy Darcy's law and is modeled with a nonlinear parabolic partial differential equation. Soil-water uptake by the root system is accounted for in the model by a volumetric sink term. The numerical implementation of the model uses one dimensional linear elements and an implicit time step. The model is designed to be sufficiently versatile that it can be applied to a wide range of soils and function with available daily meteorological data.

Efficient and reliable computer software is a prerequisite to implementing an understanding of soil physical processes into operational prediction schemes. Another requirement is more routine methods of specifying soil water characteristics. The bulletin is designed to provide the technical documentation of a computer software package that was developed with a view to contributing in these two areas. It provides the necessary technical material so that the mathematical formulation, the numerical techniques and the computer implementation can be assessed.

RESUME

Les auteurs présentent un modèle de simulation mécanographique du transport de l'eau dans le sol et de son absorption par les racines des plantes, ainsi que l'ensemble de programmes qui appliquent le modèle. La migration de l'eau est censée satisfaire la loi de Darcy et est modèlisée par une équation différentielle partielle, parabolique et non linéaire. L'absorption de l'eau du sol par le système racinaire est prise en compte dans le modèle par une variable de puits volumétrique. L'application numérique du modèle fait appel à des éléments linéaires unidimensionels et à une technique implicite par avancement de temps. Le modèle est conçu de façon suffisamment souple pour pouvoir s'appliquer à une grande diversité de sols et fonctionner à même les données météorologiques quotidiennes disponibles.

L'utilisation d'un logiciel efficace et fiable est la condition préalable à la compréhension des processus physiques du sol et à leur application dans des plans prévisionnels d'exploitation. Une autre condition consiste à utiliser des méthodes plus courantes de détermination des caractéristiques de l'eau du sol. Le bulletin a pour objet de fournir la fiche technique d'un ensemble de programmes élaborés en vue d'enrichir nos connaissances dans ces deux domaines. Il fournit le matériel technique nécessaire pour évaluer la formulation mathématique, les techniques numériques et la mise en forme mécanographique.

INTRODUCTION

Mathematical models can provide a useful synthesis of soil science, plant science and agrometeorology (Philip, 1969; Hillel, 1971). Empirical statistical approaches are often best for prediction for the average situation, but models which simulate processes can provide better insight into one year out of ten occurrences where there would not be adequate data for a valid statistical prediction. In addition, the largest benefit from mathematical modeling generally results from the analysis of abnormal situations. It is felt that this fact provides further justification for incorporating relevant physical and biological theory in models.

In order to solve many of the existing soil water simulation models, detailed soil, crop and climatic data are required (see eg. Nimah and Hanks, 1973, Feddes et al., 1974; van Bavel and Ahmed, 1976; van der Ploeg et al., 1978). Consequently the models have generally been site specific and this has limited their widespread use.

The objective of the present work is to describe a computer simulation model of soil water movement and water uptake by plant roots. The model is designed to be sufficiently versatile that it can be applied to a wide range of soils and function with available meteorological data. Simulations and predictions of the soil water regime in the rooting zone and actual transpiration for a growing crop can be carried out. Since the ratio of actual to potential transpiration can be related to the growth rate of a crop (Hanks, 1974), the model can be considered as a tool for the study of soil water effects on yield.

The flow of soil water is assumed to satisfy Darcy's law and is modeled with a one-dimensional non-linear parabolic partial differential equation. Soil water uptake by the root system is accounted for in the model by a volumetric sink term (Feddes et al., 1974). The surface boundary condition is determined from daily precipitation, potential evapotranspiration and a specification of crop cover. The basal boundary condition can be specified either as a flux or a soil water concentration. The option of specifying a water table is also incorporated.

The computer program is written with the objective of providing efficient and stable numerical algorithms that make it feasible to carry out numerical simulations for the entire growing season. Crop information relating to ground cover and root distribution can be specified as a function of crop development stages. Standardized functions are used for soil water relationships (Clapp and Hornberger, 1978), and up to four distinct soil layers can be simulated. Only minimal changes are required to simulate different soil types.

In the following, the FORTRAN computer program is described, including details required to set it up and run it. The main computer program and subroutines are discussed in sufficient detail so that it should be clear where changes are required to adapt it to a range of possible simulation problems. It is assumed that the implementation of a diffusion-based soil water simulation model would require a knowledge of soil physics sufficient for understanding the implications of specifying soil physical properties and adequate knowledge of numerical approximations to effectively deal with the problems associated with spatial and temporal grid refinements. This computer program documentation is oriented primarily to someone with this level of expertise. In addition to the software description, the reference material essential to an understanding of the simulation is included in appendices. The first appendix deals with the mathematical formulation, the second appendix deals with the numerical methods used and the third provides a listing of the computer program with a sample run.

Every computer simulation incorporates simplifying assumptions. Complex physical and biological processes must often be lumped into one simple empirical equation as for example is done here with root water uptake (Hayhoe, 1981). The mathematical complexity involved in describing water flow in a layered soil necessitates numerical approximations to the mathematical solutions (Hayhoe, 1978a; Hayhoe, 1978b). For testing and future development it is important to document the details of the simplifications and assumptions that constitute a simulation model. The computer software presented here contains a unique set of simplifications and assumptions which it is felt merit wider application and further development. This technical bulletin is viewed as a necessary component in achieving this.

COMPUTER PROGRAM DESCRIPTION

The simulation model for soil water movement and uptake by plant roots is written in FORTRAN IV using single precision arithmetic. It consists of a main program and ten subroutines. The computer program is written to be sufficiently versatile that it can simulate a range of realistic crop and soil conditions using inputs which one could anticipate being available. The input requirements include soil description, crop characteristics, weather data and computer program controls including spatial and temporal grid refinements. A soil water suction head function and a hydraulic conductivity function must be specified for each soil layer up to a maximum of four. This can be done by selecting functions presented by Clapp and Hornberger (1978) based on texture and clay content or by specifying an alternative set of functions and parameters which more appropriately represent a specific soil. Crop characteristics are input for each crop stage. Crop percentage ground cover and root dry matter distribution are required. Daily precipitation and potential evapotranspiration must be specified. Considerable flexibility has been built in to facilitate a range of formats in weather data specification. The output is designed to meet the requirements of a soil physicist or an agronomist. A detailed output is provided on a daily basis and summaries may be output at each iterations as specified by program control. The output includes a specification of the total water in the profile, the soil water distribution, the plant available water in each layer and the estimated suction head, conductivity and diffusivity throughout the profile. In addition, the daily and cumulative actual evapotranspiration, actual transpiration, and infiltration of precipitation are output. The daily flux of water through the bottom of the profile is output.

In the following, the main program and the ten subroutines are described in sufficient detail to facilitate the set up and running of the simulation model as well as its adaptation and further development. The equations specified in Appendices A and B are referenced throughout by number.

Main Program

The main program and the subroutines read the input data on logical unit 5. First, the parameters, N, NSTAGE, MD, NLAYR and DTI are read (Format 4I5, F5.1) where:

N	is the number of grid-subintervals in the profile;
NSTAGE	is the number of defined crop stages;
MD	is the total number of days to be simulated;
NLAYR	is the number of distinct soils in the profile; and
DTI	is the specified time step.

Following this ISTAGE(I) is read (Format 5I5) where ISTAGE(I) is the length in days of the Ith crop stage. Four control parameters are then read, NOUT, JWAT, IC2, and IC3 (Format 4I5) where:

NOUT	controls the number of soil water summaries output per day;
JWAT	indicates whether a water table depth is specified - if JWAT is greater than zero, water table depths are read;
IC2	controls an adjustment for water balance - if IC2 is greater than zero, no adjustment is made; and
IC3	indicates the bottom boundary condition - if IC3 equals zero, then the content is specified and the flux calculated and if IC3 equals 1 then the flux is specified and the content is calculated.

Next the thickness of grid-subintervals in cm, R(I), is read with Format (16F5.2). Following this a card is read for each soil layer with Format (I2, 6F6.2, I2) where:

ITP	is a parameter used to control the selection or entry of the coefficients for the Clapp and Hornberger equations or for user specified functions;
FC	is the water content at field capacity in cm^3/cm^3
PWP	is the water content at the permanent wilting point in cm^3/cm^3
WI	corresponds to θ_i in eq. (4);
DPTH	is the thickness of the layer in cm;

WK corresponds to θ_k in eq. (7) and

NLAY is the index of the node at the top of the layer described.

This information is used as input in the subroutine PARM, which is now called.

In order to provide for an examination of the functions resulting from the specification in PARM the suction head, conductivity and diffusivity are calculated using FUNL and output at selected moisture contents for each layer specification. Following this the node depths are calculated and output on logical output unit 7.

Throughout the main program C07 denotes air dry volumetric soil water content. This is set equal to 0.04 cm^3/cm^3. This value could vary from soil to soil and in addition one might want to make it a function of environmental conditions. The two Gaussian weighting factors, GP, are set for future numerical integrations.

The computer program is written with the objective of being able to simulate soil water conditions for a growing crop. For this reason the DO loops over time are nested in such a way as to facilitate reading the appropriate crop parameters and weather variables. The first loop is over crop stages where new crop and root parameters are set. The next loop inside the crop stage loop is over days. Here daily weather data and daily soil water flux are initialized and evaluated. Within the daily loop is a final loop over specified time steps required for the numerical solution of the differential equation. Within this loop period values for the potential evaporation and precipitation are determined in the subroutine PETFIT and the matrix equations specified in eq. (15) and (16) are set up and solved for a new soil water distribution.

In order to point out some of the special features, more detailed aspects of the program will be discussed. Before any time loops are initiated the initial volumetric soil water content in cm^3/cm^3 is read (Format 13F5.3) and also printed out on logical output unit 7. In addition, the global mass matrix, which is matrix B in eq. (15) is set up. Note that since the matrices A and B in eq. (15) are symmetrical and tridiagonal only the diagonal and upper diagonal elements are calculated and stored.

At the beginning of each daily increment loop variables are initialized as required. Note that in this version of the program sunrise in hours, denoted by SUNR, is set equal to 6 and sunset, denoted by SUNS, is set equal to 18. For some simulations it would be more appropriate to either read or calculate and store actual values in the subroutine METDAT for specification here and use in the subroutine PETFIT. In addition, the start and termination of daily precipitation in hours are denoted with WST and WEND respectively. Here WST is set equal to zero and WEND equal to 24. Again if more detailed information were available, it could be used.

A feature has been added to increase or decrease the size of the time step, DT, based on near surface soil conditions and weather variables. If less than 0.5 cm of rain occurs and the average water content at the top three nodes, CNM, is less than or equal field capacity then the time step is doubled. If more than 0.5 cm of rain occurs and CNM is less than field capacity or less than the permanent wilting point the time step is cut by one half or one quarter respectively. This adjusted time step, denoted by DT, is used for the one day. Given DT the number of time steps for the day, denote by MP, is determined.

With each time step eq. (15) is set up and solved and then eq. (16) is set up and solved. This is controlled by the index KPC. In this version of the program only one corrector step is made but additional iterations through eq. (16) are possible by increasing the limit on KPC. In addition, it is possible to eliminate the corrector step by reducing the limit on KPC required for branching out of the loop. In all cases the program sets up the matrix A and S using DP as the argument, in eq. (15) or (16). Then eq. (15) or (16) are assembled and solved for the new water content at time J+1, CS, using tridiagonal Gaussian elimination. The subroutine BCON is then called to estimate the water content, CS(1), at the surface. At the bottom boundary for the prediction step the water content is set equal to DP(N+1) where DP is the water content at time $J+\frac{1}{2}$. Alternatively, if the zero gradient is assumed, CS(N+1) can be set equal to CS(N). After the water content, CS, has been estimated for all N-1 nodes, the values are checked and forced to lie between saturation and air dry. The index KPC is checked. If the corrector steps are complete or not required then the time step is completed and KPC is initialized to zero. Otherwise, the new estimate for DP is set and KPC is incremented by one. Then a new estimate for the water content, CS, is made using eq. (16). To complete the calculations associated with each time step CN, the water content at new value of J, is set equal to CS and a new DP is estimated. The surface actual evaporation, SAE, surface water infiltration, SWIN, and the total actual evapotranspiration, including root water uptake, TRU, for the period are added to form the corresponding daily totals, TSAE, TSWIN and RAE. The control parameter IC3 is checked. If IC3 equals 1, CN(N+1) is set equal to the previously specified water content, BBC, and the flux through the bottom, FLBP, is estimated based on the gradient relationship. If IC3 equals 2, then the flux FLB is set equal to the specified BBC and the content, CN(N+1), is estimated based on the predicted flux. The accumulated flux for the period, FLBP and the total for the day TFLB are also calculated. At the end of the time step the water in the profile is calculated. An option, whose use is controlled by IC2 can be used to check the change in water content and force it to match the flux through the upper surface. Finally, an accumulation is made of surface flux for the total simulation period and a check is made for output of the soil water information for the period. When the period iterations for the day are complete then a daily summary is output on logical output unit 7.

SUBROUTINE PARM

This subroutine is called once to establish the parameters for eq. (4) through eq. (9). Since the program is designed for up to four distinct soil layers, there is a loop in the routine which generates these coefficients for each distinct layer and stores them in the two-dimensional array denoted by CO. The notation for the coefficients for each layer are as follows: CO_1 denotes b in eq. (4), CO_2 denotes ψ_s in eq. (4), CO_3 denotes θ_s in eq. (5), CO_4 equals K_s in eq. (8), CO_5 denotes c in eq. (6), CO_6 denotes d in eq. (6) and CO_6 denotes K_f in eq. (8). If a different function specification for $\psi(\theta)$ and $K(\theta)$ is used then up to eight coefficients can be read and stored in CO for each distinct layer. In addition, WI denotes θ_i in eq. (6) and WKI denotes θ_k in eq. (7). Calculated values for the coefficients from Clapp and Hornberger (1978) are stored in the routine and may be selected by specifying the control, ITYPE. Alternatively, if ITYPE equals 12, CO_1, CO_2, CO_3, CO_4 are read (Format 4F9.6).

The objective in this routine was to use available information in the specification of soil water characteristics. Therefore, if plant available water in the Ith layer PAW(I), is specified greater than zero, CO_2 in eq. (4) is adjusted to fit. If the permanent wilting point in the Ith layer, PWP(I) and field capacity, FC(I), are specified greater than zero, then CO_1 and CO_2 in eq. (4) are adjusted to fit through these points. Note that the suction at field capacity, SFC, and at the permanent wilting point, SPWP, are specified as 15000 and 344 cm of water respectively. Both SFC and SPWP can be adjusted to better fit a particular soil. In addition, where required, the coefficient CO_7 is calculated as specified in eq. (7) and eq. (8). There the conductivity at field capacity, FCK is specified as 10^{-5} cm min^{-1}.

Finally this subroutine calculates as required and prints on logical unit 7, the layer thickness, available water, field capacity and permanent wilting point for each layer based on the Clapp and Hornberger (1978) equations. In addition, the coefficients for eq. (4) through eq. (9) for each layer are printed on logical unit 7.

SUBROUTINE WTABLE

This subroutine reads the water table depth in cm, DTABLE(I), for each day of the simulation. Given the water table depth on day I, the program determines the index of the first node lying within the water table and stores the result in DTABLE(I). This subroutine is called once. If the control parameter, JWAT, is less than or equal to zero, no water table is assumed and the subroutine is bypassed.

SUBROUTINE METDAT

This subroutine is called once and its function is to input the meteorological data. The present version is structured with the view that the basic meteorological parameters could be specified in various formats from a number of sources. A control parameter IMET is defined and used in a GO TO statement so that routines can be incorporated to read data and calculate the required potential evapotranspiration. The present version simply reads on logical unit 5, the potential evapotranspiration, PEVAP(I), and precipitation, PRECIP(I), for day I with format (2F5.2).

SUBROUTINE ROOTDN

This subroutine is called at the beginning of each specified crop stage and its function is to generate the root density, RDF(I), in gm cm^{-3} for the Ith Gauss point. The location of the Ith Gauss point is denoted by THG(I), and is calculated in the routine using the grid subinterval width, R(I), and the weighting factor, GP(I). The control parameter, IROOT, the fraction ground cover, COVER, and a root effectiveness parameter, ROOTEF, are read (Format I3, 2F4.2). IROOT, is used in a GO TO statement to select the type of specification of the root. If IROOT equals 1, the coefficients are read and the distribution generated with an exponential function (Feddes et al., 1974). If IROOT equals 2, the root density and depth are read with (Format 2F10.2) and the subroutine INTERP is called to generate the root densities at the Gauss points. The results are output on logical output unit 7.

SUBROUTINE PETFIT

This subroutine is called at each time step and its function is to determine the potential surface flux, PET, in cm min^{-1} for time interval J1. PET is positive for evaporation and negative for precipitation. The daily potential evaporation, PE, is distributed between sunrise, SUNR, and sunset, SUNS, specified in hours using a sine curve. The rainfall, W, in cm is distributed uniformly from the start, WST hours, and the end, WEND of the precipitation. Daily precipitation is distributed uniformly throughout the day. The precipitation for period, J1 is then subtracted from the potential evaporation to produce PET.

SUBROUTINE ROOTUP

This subroutine is called at each iteration where both PET and the fraction ground cover are greater than zero. It calculates the root uptake using the model specified in eq. (3) and described in detail in the section on mathematical methods. The root suction, ψ_r, is denoted by RP and set to 15000 cm water. Referring to eq. (3), c^r is denoted in the subroutine by ROOTEF, HKA(I1) denotes the Ith Gauss point value of $K(\theta)$; HWA(I1) denotes the Gauss point value of $\psi(\theta)$; RDF(I1) denotes the Gauss point value of W(x); and ZAE(I1) denotes the Gauss point value of R. Note that ZAE is always set greater than or equal to zero and is set equal to zero when HWA is less than 50 cm water to account for the fact that roots generally do not take up water when oxygen becomes limiting. The potential transpiration, X, is determined by multiplying

PET by COVER. The root uptake, UT, is accumulated until it equals X. On the corrector step of the predictor corrector routine, the root water uptake in cm for the profile in time DT, UT3, and the cumulative root water uptake, TRU, are set.

SUBROUTINE FUNL

This subroutine is called once for each iteration. Its function is to estimate the hydraulic conductivity, HKA, the soil water suction, HWA, and the soil water diffusivity DIA at each Gauss point using the Clapp and Hornberger functions parameterized in PARM. In addition, it is indicated in the routine where and how one could specify alternate functions.

The subroutine is structured to admit a layered soil. The program loops over the number of layers, NLAYR. Firstly it sets the coefficients and parameters for the layer and then sets the limits, NMIN and NMAX, for a loop over the Gauss points within in the layer. The assumption is made that the soil water parameters change is continuous over the interface layer. Therefore, the function evaluations at the first Gauss point in the new layer are based on the layer above while at the second Gauss point on the new layer. This is controlled by the index JMIN.

SUBROUTINE DISCON

This subroutine is called once for each iteration if the soil is layered. Its function is to add a correction term to the numerical approximation to eq. (1) at the soil interface to account for the change in soil water suction due to a change in soil. This adjustment is required because ψ is a function of θ and x rather than θ alone across the interface layer. The derivative of ψ with respect to x, at a fixed time t, across the interface layer must include the derivative of ψ with respect to x, denoted by DERIV, for a fixed water content, denoted by XAV, as well as the usual derivative of ψ with respect to θ which is incorporated in the diffusivity term in eq. (1). The derivative of ψ with respect to x, DERIV, is evaluated across the interface layer by assuming linear interpolation between the two layers.

SUBROUTINE BCON

This subroutine is called at each iteration. Its function is to use the potential flux of water, which is denoted by PET, to calculate both the new water concentration at the surface node and the actual soil water flux at the surface. If evapotranspiration can occur, the index for crop ground cover, COVER, is used to partition evaporation from the soil surface and transpiration from the crop canopy.

Two approaches to estimating the surface boundary conditions have been incorporated and they are selected using the control parameters, ISURF. If ISURF equals 0 then the equation for water transfer in the surface layer is used directly. The concentration at the surface node, CS(1), which would be required to give the gradient to produce the potential flux is estimated first. Note that HI denotes a weighted average hydraulic conductivity and DI denotes a weighted average diffusivity for the surface layer. The weighting is set to best simulate evaporation or infiltration conditions. If the resulting value for CS(1) does not lie between air dry, CO_7, and saturation, CO_3 then CS(1) is set to the appropriate value and flux is estimated based on the resulting gradient in water content.

If ISURF is greater than zero the value of CS(1) is smoothed by assuming it is equal to the average water content in the top half of the surface layer. The amount of water in the upper half layer is budgeted based on flux through the surface and flux of water across the mid-point of the layer.

SUBROUTINE INTERP

The subroutine is called by ROOTDN if observed root densities are used. In addition, it has potential usefulness for interpolating between observations of a range of input information. The observed dependent and independent variables are denoted within the subroutine by Y and X respectively. N denotes the number of observation points and M denotes the number of points to be interpolated. Note that the routine uses linear interpolation between observed values. The interpolated dependent and independent values are denoted by CINTRP and XINTRP respectively.

RESULTS AND DISCUSSION

In this section a typical test run of the modelling program is presented. It is assumed that to use this computer program, one would start with this test case and then modify it to meet special requirements. It consists of a 20-day simulation with a layered soil. The top 30 cm is assumed to be a sandy clay loam and the remaining 90 cm is clay. The initial soil water content is set equal to field capacity. The potential evapotranspiration is assumed equal to 0.7 cm throughout. On day 11 of the simulation, 3.0 cm of precipitation is added to the profile. The crop is assumed to go through two 10-day development stages during the simulation. The details of setting up this computer run are delineated in the following.

The simulation was run on a VAX mini-computer which is part of Agriculture Canada's AGRONET system. The input used for the sample run is presented in the appendix. The first statement read from the input file sets N equal 18, NSTAGE equal 2, MD equal 20, NLAYR equal 2 and DT1 equal 60. The next statement specifies the two crop stages, ISTAGE(I), equal 10 days each. The third statement sets NOUT equal 3, JWAT equal 0, IC2 equal 0 and IC3 equal 0. The next two statements read give the 18 grid-subinterval widths denoted by R(I). Two statements are then read to specify the soil for each layer. For the top layer ITP equals 6; FC, PWP and PAW are unspecified and threfore set equal 0; WI equals 0.92, DPTH equals 30; WK equals 0.9 and NLAY is equal 1. For the second layer ITP equals 11; FC, PWP and PAW are 0; WI equals 0.92; DPTH equals 90; WK equals 0.9 and NLAY is equal 8. The next two statements specify the initial values for CN(I). CN is set equal to 0.25 in the top 30 cm and 0.373 in the bottom 90 cm which correspond to field capacity for the respective layers. Rather than reading in the values for precipitation and potential evapotranspiration, they are generated in the subroutine METDAT. The final four statements are read by the subroutine ROOTDN and specify canopy and rooting characteristics for the two crop stages. For the first stage two statements are read which set IROOT equal 1, ROOTEF equal 1, COVER equal 0.5, A equal 5.13 and B equal 0.32. The final two statements in the input file specify for the second crop stage, IROOT equal 1, ROOTEF equal 1, COVER equal 0.9, A equal 5.13 and B equal 0.08. The coefficients A and B for the two crop stages, give rise to root density distributions as plotted in figure 1.

The output generated by the soil water model run with these controls is included in the appendix. The first two output lines are the input statements specifying the soil and layer thickness. The layer characteristics as calculated in the subroutine PARM are then printed, including the coefficients for the soil water functions. In this simulation field capacity is set to 344 cm of water and the permanent wilting point to 15000 cm of water. In addition K_f in eq. (9) is set equal to 10^{-5} cm/min. In order to specify more clearly the resulting soil water functions for each soil layer, their value at ten equally spaced water contents is calculated and output and plotted in figures 5, 6 and 7. The node depths and initial water content at this node are printed.

The root distribution generated in the subroutine ROOTDN assuming an exponential function is printed for the first crop stage. This is followed by detailed results of fluxes, root water uptake and soil water distribution estimation. Since NOUT is set equal to 3, the estimated water content at the nodes is output as well as the water in the profile and the flux through the bottom every eight hours. Note that in this sample model run, zero water content gradient is assumed across the lowest grid subinterval. It should be pointed out that since the computer simulation involves a numerical approximation to eq. (1), that inappropriately large spatial or temporal grid refinements can lead to unacceptable errors. In this output hourly time steps were used and the errors resulting from the numerical techniques did not appear unacceptable given the levels of accuracy expected in the input data. For large hydraulic conductivities, used with large time steps, the estimated flux through the bottom can be too large and should be checked against the change in the water in the profile.

At the end of each day a summary of the fluxes and soil water profile is printed. Firstly the estimated average water content and the percent plant available water are printed for each soil layer. A summary of daily and cumulative values for potential evapotranspiration (PE) and actual evapotranspiration (AE), transpiration, precipitation and infiltration is printed.

Since crop stage 2 starts on day 11, the new crop root distribution is evaluated and printed. For stage 2, the crop canopy parameter, COVER, is set equal to 0.9. In the flux summary for day 11, the results of the first precipitation are printed. The precipitation is 3 cm and 2.3 cm infiltrated the soil. The difference equals the PE which is subtracted before the water enters the soil. Under these conditions the model leaves the AE and transpiration remain at 0 for the day.

The accumulated volumes of potential evapotranspiration, actual evapotranspiration and its components are shown in figure 2. Although during the first 2 or 3 days of the simulation run the actual evaporation and the actual transpiration were very similar, later on the rate of actual evaporation dropped off quickly to less than 0.1 cm day^{-1}. Even the 3 cm rainfall on day 11 did not substantially increase this rate. Consequently, the rate of actual transpiration approximated the rate of actual evapotranspiration.

During the first 10 days of the simulation period, the rate of actual evapotranspiration decreased slowly (Figure 2) in response to decreasing water availability (Figure 3), especially in the upper layer. However, because of the increased rooting depth and density and the 3 cm of rain on day 11, the rate of actual evapotranspiration followed closely the potential evapotranspiration rate. For example, the model predicted an actual average evapotranspiration rate of 0.65 cm day^{-1} between day 11 and 20, while the potential rate was 0.7 cm day^{-1}.

Some of the soil water content profiles produced by this particular simulation run are shown in figure 4a and b. The discontinuous nature of these profiles is due to the fact that we assumed that the soil water potential and not water content distribution itself, was continuous throughout the profile, across layer interfaces. During the first 10 days the water content in the upper layer decreased rapidly by 7% to an average water content of 0.18 cm^3 cm^{-3}, while that of the lower layer decreased by only 2% to 0.35 cm^3 cm^{-3}. Plant available water dropped correspondingly from 100% to 33% in the upper horizon and to 73% in the lower layer (Fig. 3). During the second half of the simulation run, when the root system had expanded three-fold, the water content of the upper layer decreased to 0.13 cm^3 cm^{-3}, which was below the permanent wilting for the layer, while the water content of the lower layer had decreased to 0.32 cm^3 cm^{-3}, which corresponded to 54% plant available water. The water in the entire profile fell from 37.6 cm on day 10 to 34.1 cm on day 20. However, the ratio of actual to potential transpiration increased from 0.65 to 0.91 during the same time period, which demonstrates the model's sensitivity to changes in the root system.

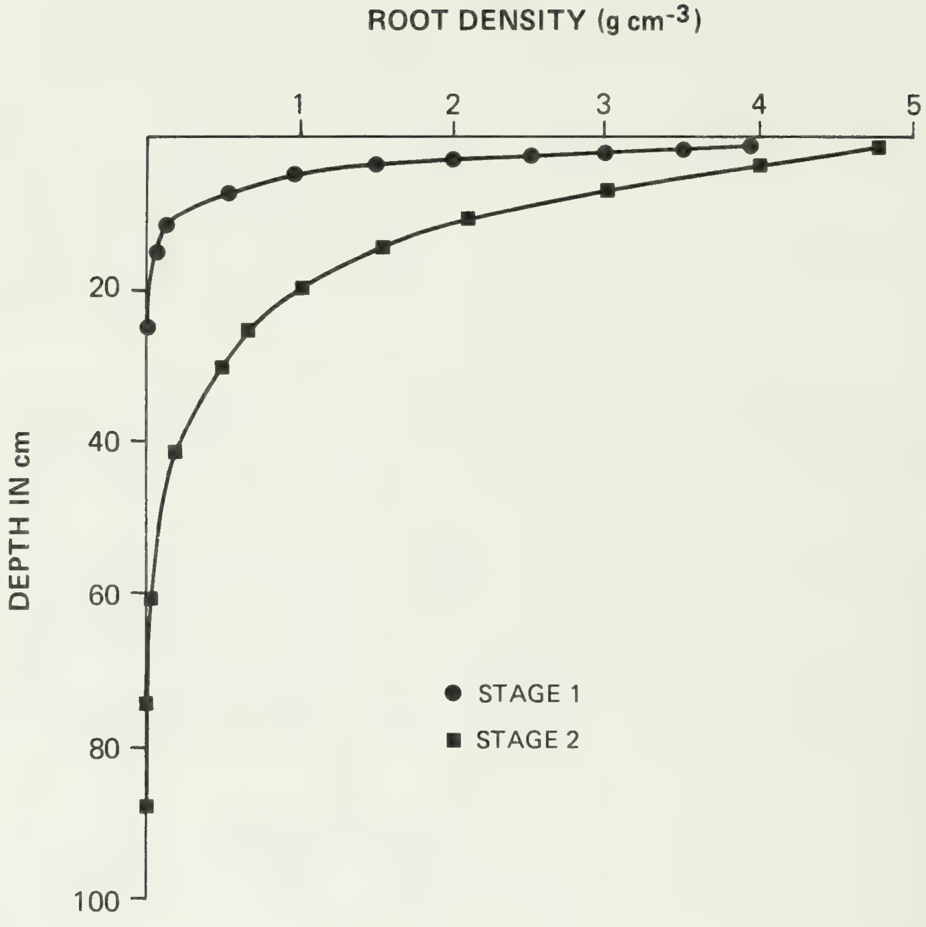


Figure 1: Root density distributions used in the simulation to demonstrated root water uptake

Figure 2: Simulated evaporation and transpiration for 20-day period

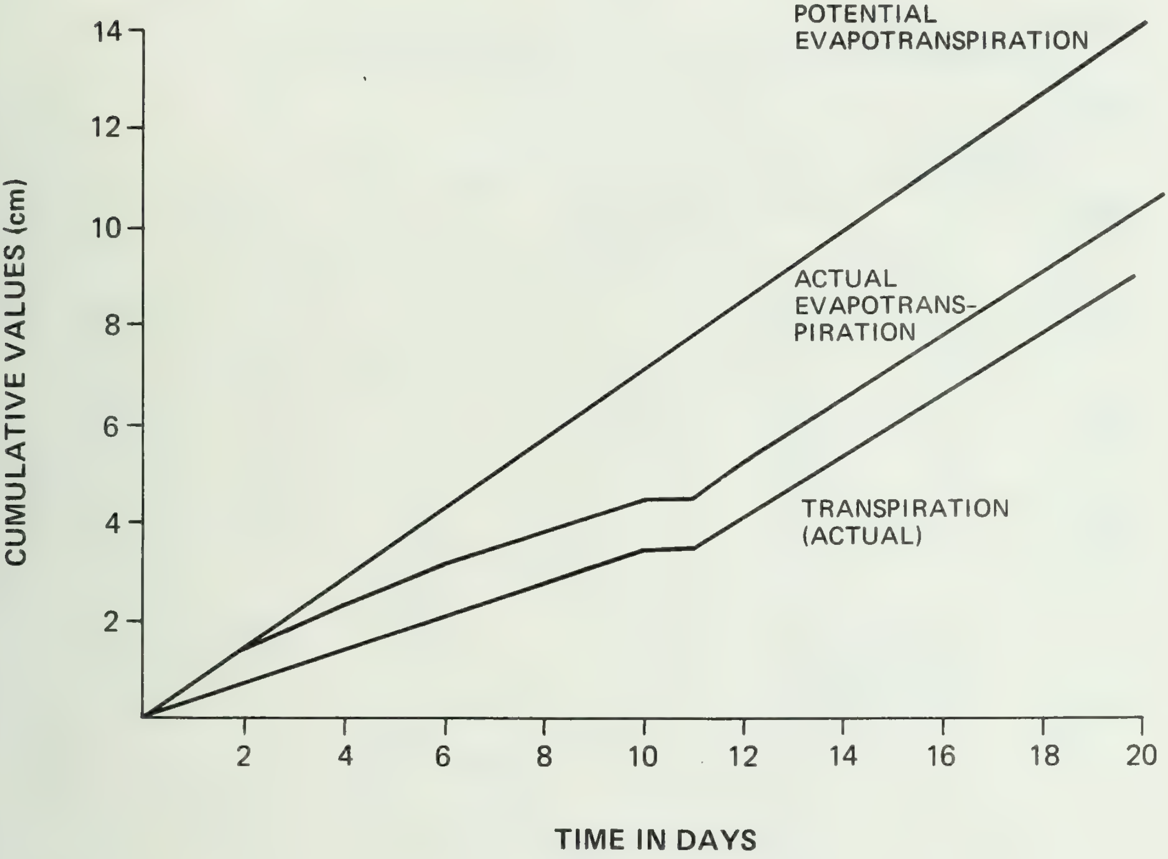
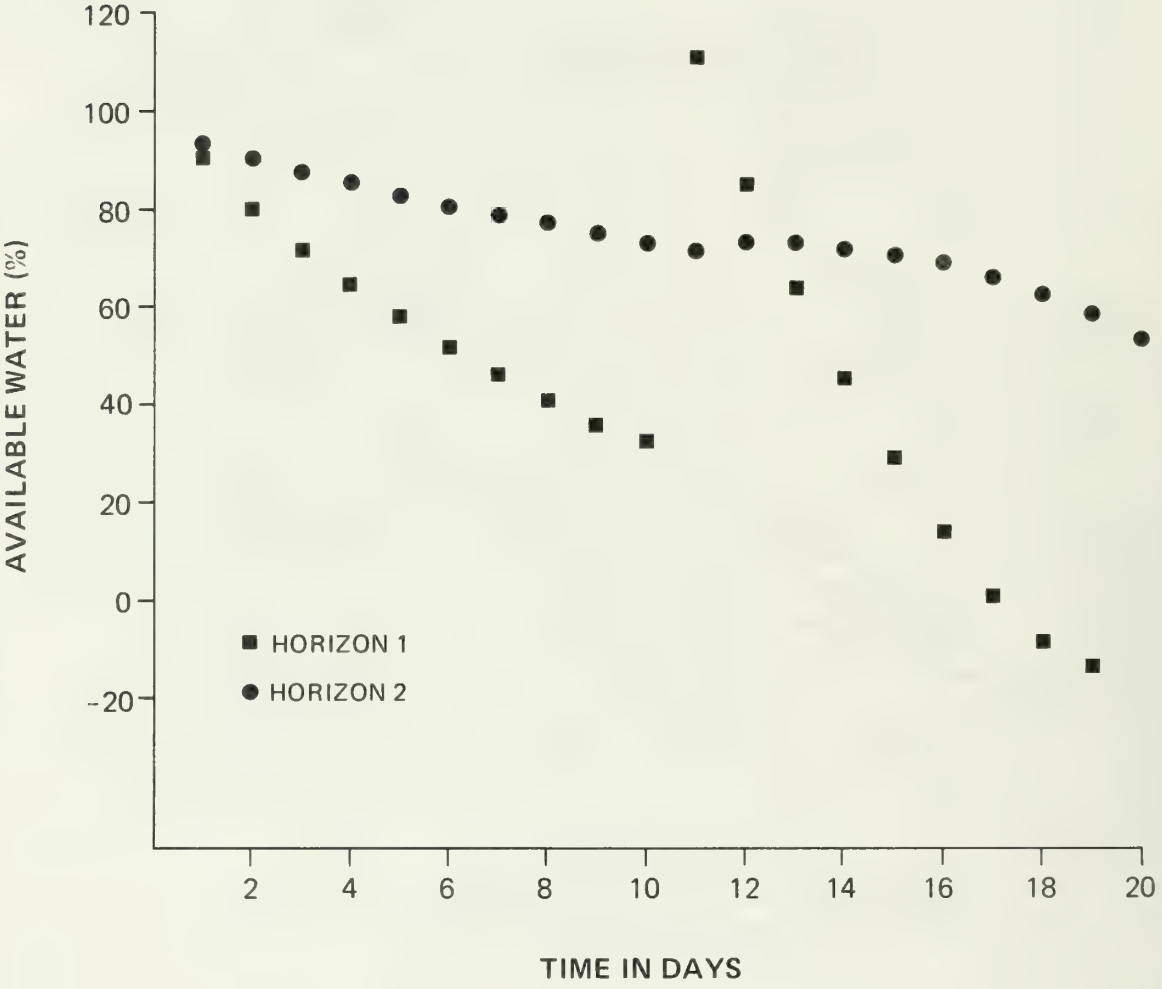


Figure 3: Simulated plant available water over a 20-day period for both the upper and lower soil horizon.



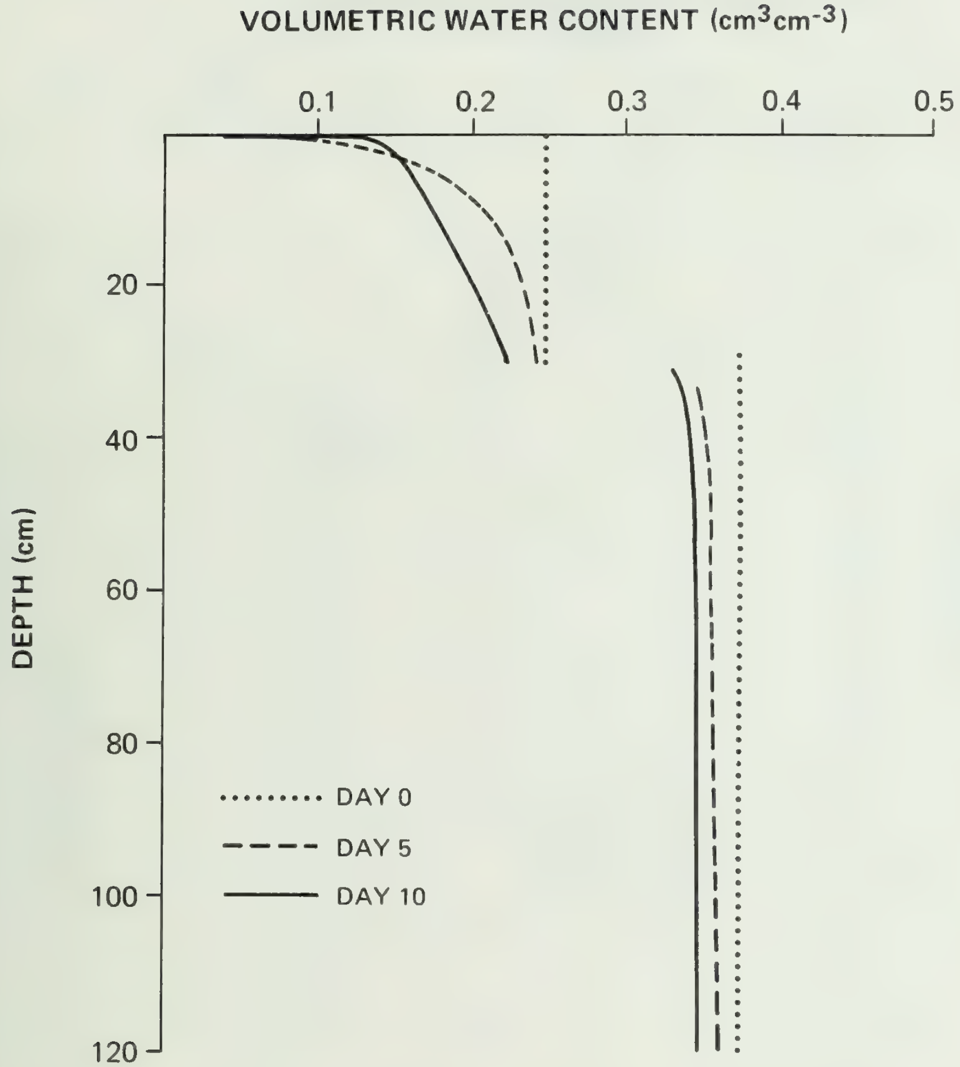


Figure 4a: Simulated soil water content profiles at selected times during the first 10-days

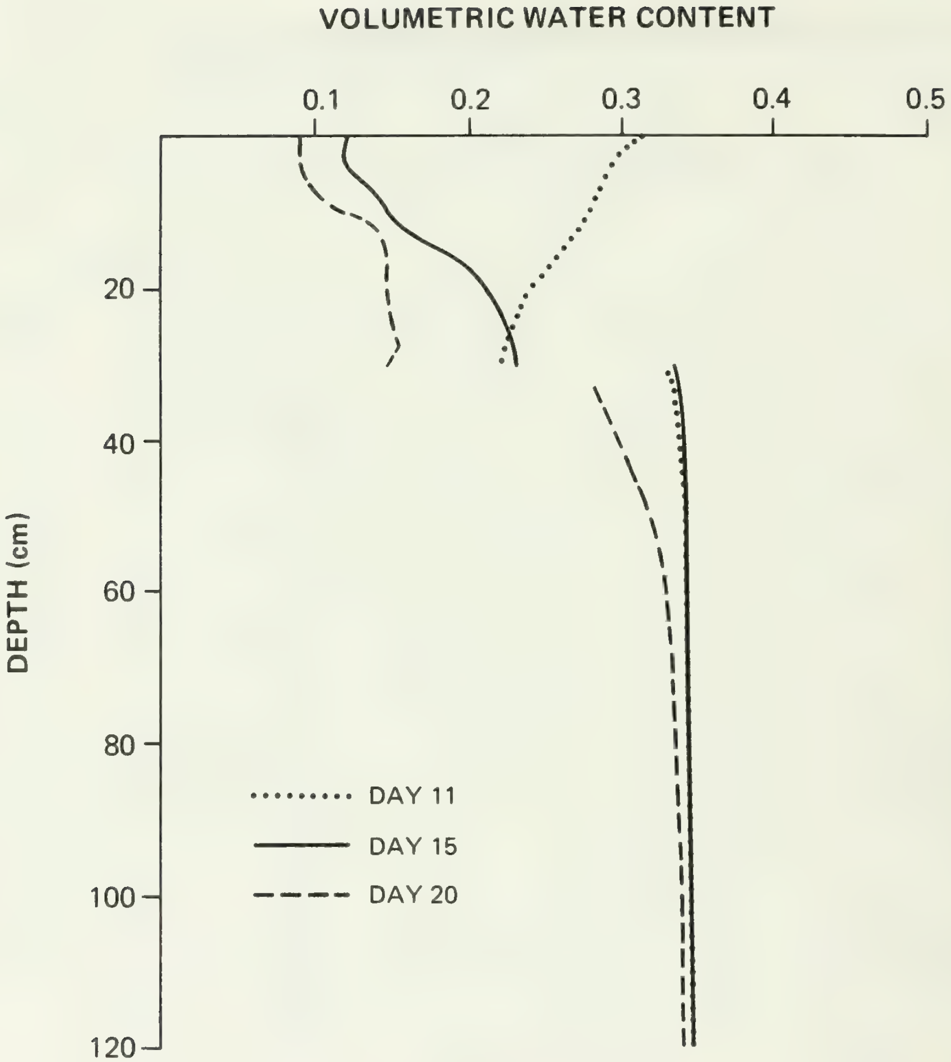


Figure 4b: Simulated soil water content profiles at selected times during the last 10-days

Figure 5: Soil water and suction head relations used in simulation.

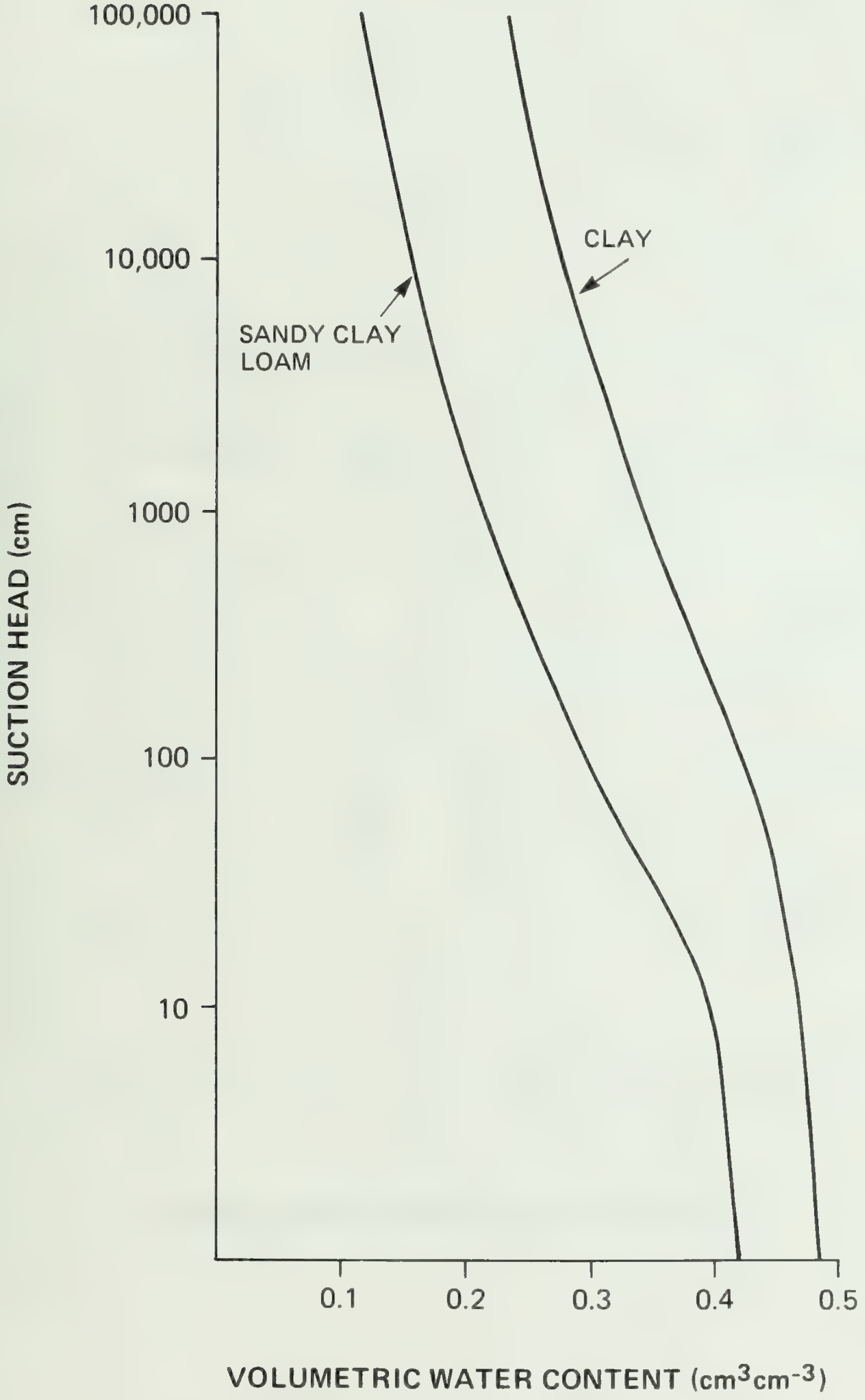


Figure 6: Hydraulic conductivity functions used in simulation

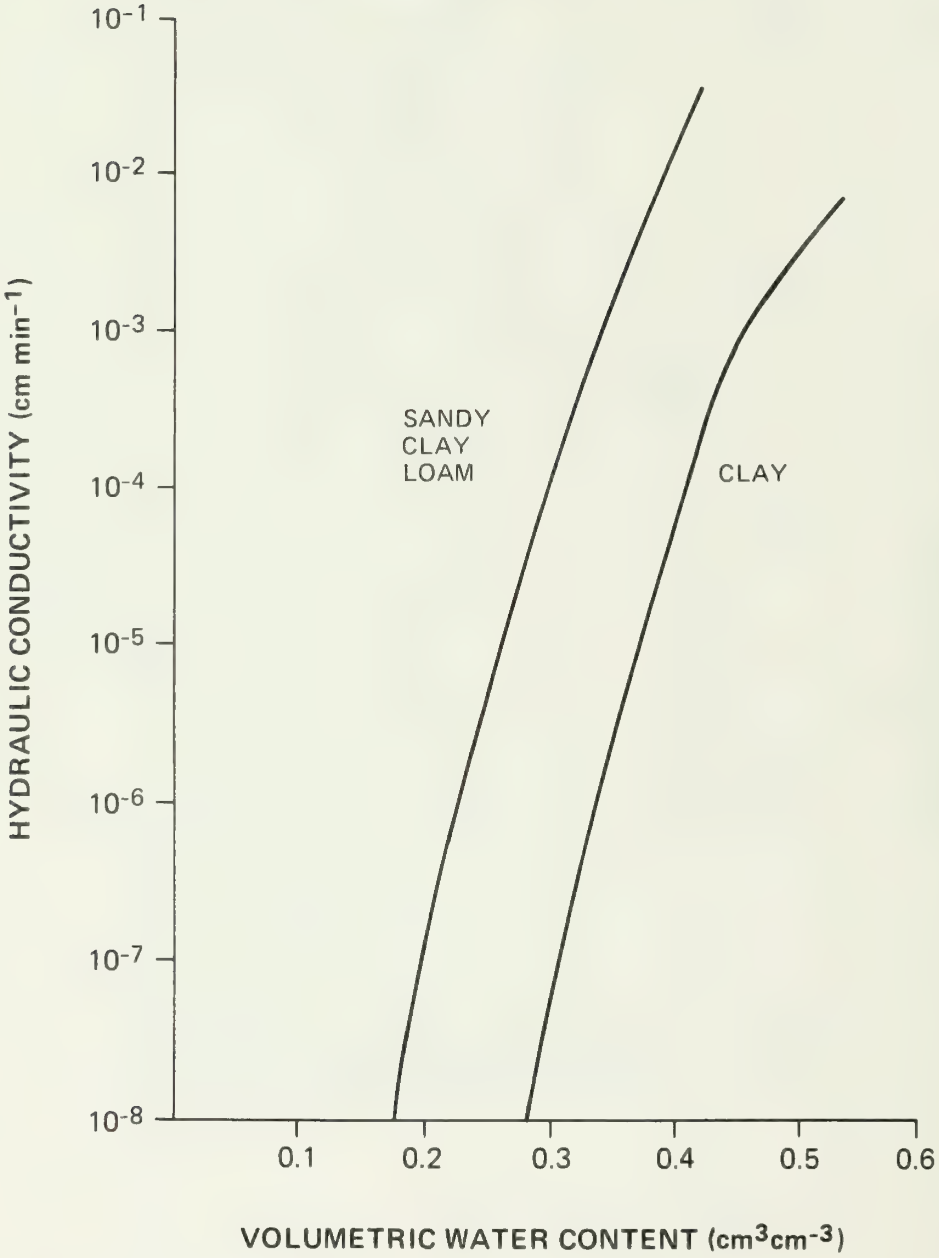
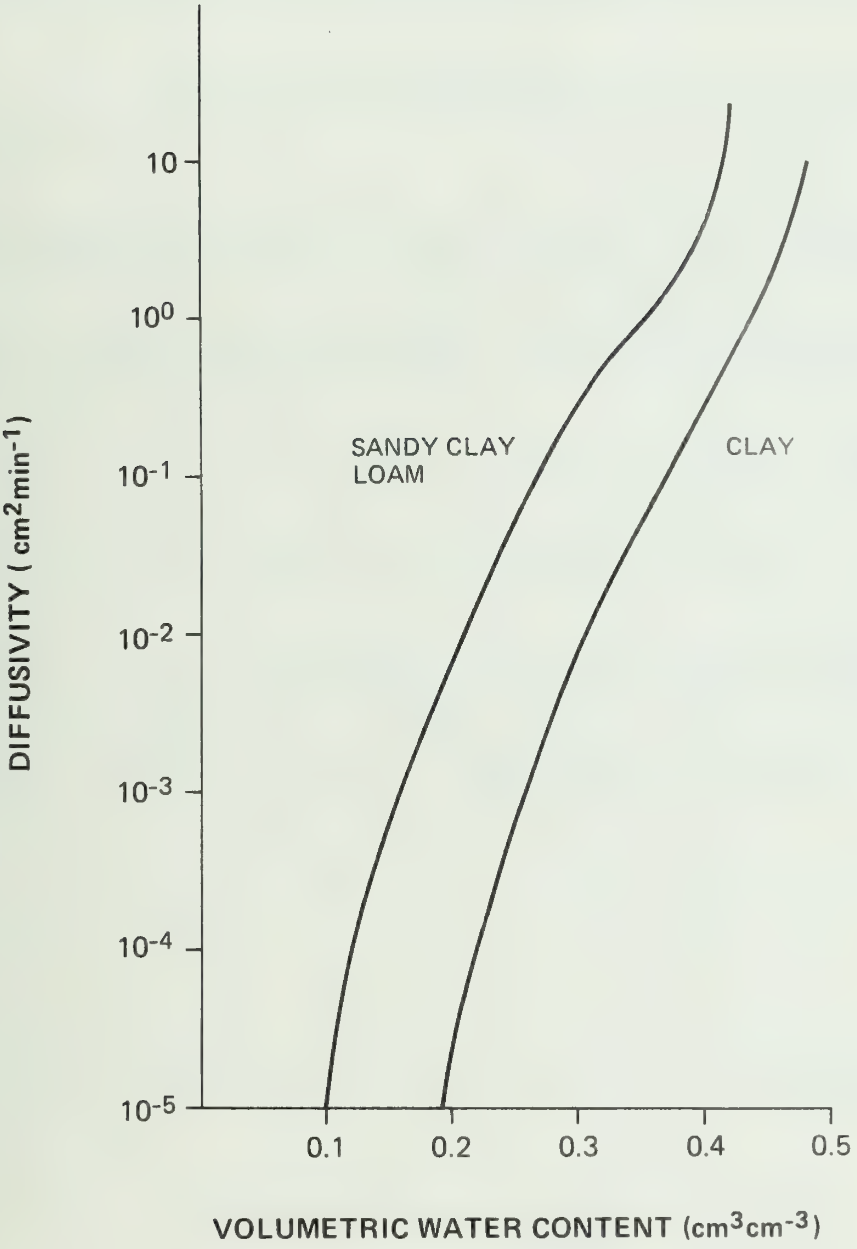


Figure 7: Diffusivity functions used in the simulation



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APPENDIX A

Mathematical Methods

In this section we provide a summary of the mathematical procedures used in the modelling program. The mathematical equations for the movement of soil water and the uptake by plant root systems have been specified as follows:

$$\frac{\partial\theta}{\partial t} = \frac{\partial}{\partial x} \left(D(\theta)\frac{\partial\theta}{\partial x} + K(\theta)\right) + R(\theta, x, t) \tag{1}$$

where
t is time in min, t takes values from 0 to T;
θ is the volumetric water content in cm^3 of water per cm^3 of soil;
x is the vertical distance from the soil surface in cm (positive downward), x takes values from 0 to L;
$\psi(\theta)$ is the soil-water suction head function in cm;
$K(\theta)$ is the hydraulic conductivity of the soil in cm per min;
$D(\theta)$ is the soil-water diffusivity function defined by the equation

$$D(\theta) = \frac{d\psi}{d\theta} K(\theta); \tag{2}$$

$R(\theta, x, t)$ is the water uptake by roots in cm^3 of water per cm^3 of soil per min. To solve eq. (1), $\theta(x,t)$ must be specified for all x at $t=0$ and for $x=0$ and $x=L$ for $t=0$ to T. Meteorological conditions are required to specify $\theta(0, t)$ and L is chosen such that an appropriate value for $\theta(L, t)$ can be determined, either by specifying a concentration or flux condition at $x=L$. Following Feddes et al. (1974), the root sink term is defined by:

$$R(\theta, x, t) = cK(\theta) \quad (\psi_r - \psi(\theta)) \quad W(x) \tag{3}$$

where
$W(x)$ is the root weight function in gm per cm^3;
ψ_r is the root suction head;
c is a parameter to adjust for root effectiveness.

A major obstacle to successful application of this mathematical model to an actual soil system relates to the problem of appropriately specifying $K(\theta)$, $\psi(\theta)$, and R. A potentially useful approach to this problem has been suggested by Clapp and Hornberger (1978). They propose standardizing $K(\theta)$, and $\psi(\theta)$ so that a change in soil would only require a change of the parameters in the standardized relations. Further, they provide parameters for their functions for a wide range of soil textures and soil clay contents. The problem of specifying $K(\theta)$ and $\psi(\theta)$ now reduces to that of providing the appropriate parameters by selecting them from a table according to textural group (Clapp and Hornberger, 1978) or by deriving them from point observations on $K(\theta)$ and $\psi(\theta)$. Following Clapp and Hornberger (1978),

$$\psi(\theta) = \Psi_s \ (\theta/\theta_s)^{-b} \qquad 0 \le \theta \le \theta_s \tag{4}$$

$$K(\theta) = K_s \ (\theta/\theta_s)^{2b+3} \tag{5}$$

where b, θ_s, Ψ_s and K_s are the parameters to be specified. It is assumed that θ_s is the saturated water content and that K_s is the saturated hydraulic conductivity. Since $\psi(\theta_s) = 0$, a value θ_i, is selected near θ_s, and a parabola for $\psi(\theta)$ is fit for θ between θ_i and θ_s such that $\psi(\theta)$ and its derivative are continuous at θ_i. On this interval,

$$\psi(\theta) = c(\theta/\theta_s - d)\ (\theta/\theta_s - 1) \qquad \theta_i < \theta \leq \theta_s \tag{6}$$

where c and d are evaluated according to the conditions just specified.

During the course of this study, it was found that a similar adjustment might be required for $K(\theta)$. For example, if $K(\theta)$ undergoes a very sharp increase near θ_s, as is commonly observed in highly structured media and fine textured soils, selecting K_s equal to the observed saturated hydraulic conductivity would result in values for $K(\theta)$ which are too large for a wide range of intermediate θ values. The adjusted equation for hydraulic conductivity was then specified by:

$$K(\theta) = K_f\ (\theta/\theta_s)^{2b+3} \qquad 0 \leq \theta < \theta_k \tag{7}$$

$$K(\theta) = K_f\ (\theta/\theta_s)^{2b+3} + (K_s - K_f)\ ((\theta-\theta_k)/(\theta_s - \theta_k))^2$$

$$\theta_k < \theta \leq \theta_s$$

where θ_k is an intermediate value for θ for which $K(\theta_k)$ is known or can be estimated. The value of the parameter K_f, is determined from eq. (7) by the relation

$$K_f = K(\theta_k)\ \ (\theta_s/\theta_k)^{2b+3} \tag{9}$$

For this study, θ_k was selected such that $\psi(\theta_k)$ equalled 344 cm H_2O, a value which has been found to approximate field capacity (Colman, 1947; Haise et al., 1955). Field capacity was chosen because by definition it corresponds to a condition of low conductivity for all soils. Data presented by Ahuja (1973) and Bruce and Whisler (1973) suggest that this small value may be between 10^{-5} and 10^{-6} cm min^{-1} for a wide range of soil textures. Hence, in the absence of a measured value for $K(\theta_k)$ it was assumed to be 10^{-5} cm min^{-1}, except under the condition where the resulting K_f was greater than K_s; in that case eq. (5) was used.

It should be pointed out that the estimated values for $\psi(\theta_k)$ and $K(\theta_k)$ are averages. Undoubtedly better estimates can be obtained and substituted when specific soil types and textural groups are considered, and of course measured data should be used whenever they are available.

A major function of the mathematical model for soil water is to predict the actual evapotranspiration. The potential evapotranspiration is the combined evaporation from the soil surface and transpiration from the plant which would occur if water were not limiting. It is determined by meteorological and crop parameters (Feddes et al., 1974). The partitioning of the potential evaporation between the plant and soil surface is determined by the crop cover similar to the procedure proposed by Nimah and Hanks (1973).

Water is assumed to evaporate from the soil surface at the potential rate when moisture is not limiting which provides a flux surface boundary condition. Under drier conditions the actual evaporation is controlled by the rate of upward water movement to the soil surface. Under such conditions, the upper boundary condition is to set the soil water content to its air dry value. Similarly, for precipitation water enters the soil at a rate equal to the precipitation until the surface becomes saturated. Then the surface is assumed saturated and infiltration is limited by the rate with which water flows through the surface zones.

Transpiration by the plant is controlled by the sink term specified by eq. (3). Feddes et al. (1974) proposed using an iterative technique to evaluate ψ_r such that the plant would transpire at the potential rate until ψ_r reached a maximum of 15000 cm of water. The assumptions specified in their model appear to permit water moving from the plant into the soil. Here, a simpler procedure is proposed. It is assumed that the crop will attempt to meet evaporative demand from the top zone. If this is not possible it will extract water successively through lower zones until the potential transpiration is achieved. If the potential is not achieved then the actual transpiration is the sum of the water extracted from each zone. The model assumes the value of ψ_r in eq. (3) reaches the maximum of 15000 cm of water in each zone. This model specification should not be interpreted to mean that all the plant available water is extracted from the upper zone before any water is extracted from lower zones. Firstly, whenever the actual transpiration is less than the potential, water is extracted from all zones simultaneously as specified by eq. 3. These results would be identical to those predicted by the model presented by Feddes et al. (1974). When water is available both near the surface and deep in the profile, the model assumptions imply that the crop would first use the readily available moisture near the surface. The justification for this assumption is that in the top layer of the soil the temperature, nutrients and aeration are generally most favorable for root activity. As water is depleted, uptake from the surface zones decreases rapidly due to the rapid decrease in $K(\theta)$ in eq. (3). The result is again a more uniform extraction pattern of soil water by the crop roots.

APPENDIX B

Numerical Methods

Eq. (1) is solved numerically using linear piecewise elements and the Galerkin technique as described by Hayhoe (1978). The space variable is discretized by using linear elements and the time variable is discretized using a Crank-Nicolson procedure.

Consider first the general approach. Let S be the set of real-valued, piecewise continuously differentiable functions, $w(x)$, on (o,ℓ), and let S_m denote an m-dimensional subspace of S which is spanned by m basis functions, $w_i(x)$. Assume a solution to eq. (1) of the form

$$\theta_m (x,t) = \sum_{k=1}^{m} a_k(t)\ w_k(x) \tag{10}$$

The $a_k(t)$'s are determined in part by the initial and boundary conditions. An operator, L, is defined on θ by

$$L(\theta) = \frac{\partial\theta}{\partial t} - \frac{\partial}{\partial x}\ (D(\theta)\ \frac{\partial\theta}{\partial x} + K(\theta)) - R(\theta,\ x,\ t) \tag{11}$$

The remaining $a_k(t)$'s are determined from the relationship

$$(L(\theta_m),\ w_j) = \int_o^{\ell} L(\theta_m)\ w_j dx = 0,\ j = 2,3,\ldots,m-1 \tag{12}$$

for all $o<t<T$. Rearranging eq. (12) and integrating by parts one obtains a system of m-2 first-order differential equations which in matrix notation can be written as:

$$B\ \frac{d\underline{a}(t)}{dt} + A(\theta_m)\ \underline{a}(t) = S(\theta_m). \tag{13}$$

Here B is an (m-2) x (m-2) matrix with (i,j)th element equal

$\int_o^{\ell} w_i w_j dx$; $A(\theta_m)$ is an (m-2) x (m-2) matrix with

(i,j)th element equal to $\int_o^{\ell} D(\theta_m)\ \frac{dw_i}{dx}\ \frac{dw_j}{dx}\ dx$;

$\underline{a}(t)$ is an (m-2) x 1 matrix equal to $\begin{bmatrix} a_2(t) \\ a_3(t) \\ \vdots \\ a_{m-1}(t) \end{bmatrix}$; and $S(\theta_m)$ is an (m-2) x 1 matrix with jth element

$$\int_o^{\ell} \left[\left(\frac{da_1}{dt}(t)\, w_1 + \frac{da_m}{dt}(t)\, w_m\right) w_j + D(\theta_m) \left(a_1(t)\, \frac{dw_1}{dx} + a_m(t)\, \frac{dw_m}{dx}\right) \frac{dw_j}{dx} + K(\theta_m)\, \frac{dw_j}{dx} - R(\theta_m, x, t)\, w_j\right] dx.$$

For the matrices in eq. (13) $i = 2,3,\ldots,m-1$ and $j = 2,3,\ldots,m-1$.

For linear elements, chapeau functions are used. The interval (o,ℓ) is divided into N subintervals with h_i denoting the length of the ith interval. The functions, w_i, are chosen so as to form what is called a local or patch basis since they are zero everywhere in (o,ℓ) except on at most two adjacent subintervals. The basis function is defined by the relation

$$w_{i+1}(x) = \begin{cases} \left(x - \sum_{k=1}^{i-1} h_k\right) / h_i & \text{on the ith subinterval} \\ \left(\sum_{k=1}^{i+1} h_i - x\right) / h_{i+1} & \text{on the (i-1)th subinterval} \\ 0 & \text{elsewhere on } (o,\ell). \end{cases} \qquad (14)$$

Substitute these basis functions into eq. (13), $A(\theta_m)$ and B become (m-2) x (m-2) symmetric tridiagonal matrices.

The next step in determining the numerical approximation to eq. (1) involves the discretization of eq. (13) with respect to time. This was achieved using Crank-Nicolson extrapolation (Douglas and Dupont, 1970).

Define

$$a_i^j = a_i(j\Delta t) \qquad i = 1,2,\ldots,m \quad j = 0,\ldots,K$$

and $\theta_m^j(x) = \theta_m(x,j\Delta t)$

where $\Delta t = T/K$. Then (13) becomes,

$$\left(\frac{1}{\Delta t} B + .5\, A(1.5\, \theta_m^j - .5\, \theta_m^{j+1})\right) \underline{a}^{j+1} = \left(\frac{1}{\Delta t} B - .5\, A(1.5\, \theta_m^j - .5\, \theta_m^{j-1})\right) \underline{a}^j + S(1.5\, \theta_m^j - .5\, \theta_m^{j-1}) \qquad \text{(1}$$

An optional corrector step can be indicated using the estimate from eq. (15), which is denoted by $\hat{\theta}_m^{j+1}$ (Douglas and Dupont, 1970). The corrector step is specified by

$$\left(\frac{1}{\Delta t} B + .5\, A(.5\,(\theta_m^j + \hat{\theta}_m^{j+1}))\right) \underline{a}^{j+1}$$
$$= \left(\frac{1}{\Delta t} B - .5\, A(.5\,(\theta_m^j + \hat{\theta}_m^{j+1}))\right) \underline{a}^{j} + S(.5\,(\theta_m^j + \hat{\theta}_m^{j+1})) \qquad (16)$$

The problem of using the finite element method to find a numerical solution to eq. (1) has now been reduced to solving a linear matrix equation for each j. When j = 0, $\underline{a}^o$ is determined using nodal values from the initial condition and thus θ_m^o is known from eq. (10). Since θ_m^j and θ_m^{j-1} are required in eq. (15) to determine $\underline{a}^{j+1}$, eq. (15) cannot be applied to the calculation $\underline{a}^1$. For this initial case a predictor-corrector technique is used (Douglas and Dupont, 1970). For j = 1,2,..., K-1, eq. (15) and eq. (16) define the procedure for evaluating $\underline{a}^{j+1}$, and from the boundary conditions a_1^j and a_m^j are evaluated.

An obstacle to the efficient application of Galerkin procedures for nonlinear equations of the type presented here is that the matrices in eq. (15) must be calculated at each time step. This involves performing an integration such as

$$\int_o^{\ell} D(1.5\,\theta_m^j - .5\,\theta_m^{j-1})\,\frac{dw_i}{dx}\,\frac{dw_k}{dx}\,dx \qquad (17)$$

for all i and k equal 2,3,... m-1. We considered this problem and tried to make our solution as efficient as possible. The integrals were calculated using Gaussian integration (Dahlquist et al., 1974) with two Gauss points per subinterval for linear elements. The result of this was that for example, only $D(1.5\,\theta_m^j - .5\,\theta_m^{j-1})$ had to be calculated for each Gauss point and then the required summations performed to evaluate $A(\theta_m)$ at each time step.

As has been pointed out, most of the elements in $A(\theta_m)$ and B are zero. This was taken advantage of in order to economize on program size and to improve efficiency. A technique described by Schwarz et al. (1973) for banded matrices was used to solve eq. (15) and eq. (16).

```
C---- ONE DIMENSIONAL SIMULATION MODEL FOR SOIL WATER TRANSPORT AND
C---- ROOT UPTAKE. THE DIFFUSION BASED MODEL IS SOLVED USING LINEAR
C---- FINITE ELEMENTS AND AN IMPLICIT TIME STEP
C---- CN(I) IS MOISTURE CONTENT AT NODE I AT TIME T
C---- CP(I) IS MOISTURE CONTENT AT NODE I AT TIME T-1
C---- DP(I) IS MOISTURE CONTENT AT NODE I AT TIME T+.5
C---- CS(I) IS MOISTURE CONTENT AT NODE I AT TIME T+1
C---- THE UNITS FOR SOIL MOISTURE ARE CC/CC
C---- COVER IS THE FRACTION OF SOIL SURFACE COVERED BY THE CROP CANOPY
C---- NLAY(I) IS THE NODE AT WHICH THE ITH SOIL TYPE BEGINS
C---- R(I) IS THE WIDTH IN CM OF THE ITH GRID-SUBINTERVAL
      DIMENSION CP(25),AD(25),AU(25),BC(25),BU(25),S(25),CD(25),CU(25)
      DIMENSION GP(2),BBC(100),FC(4),PWP(4),PAW(4),DPTH(4),NLAY(5),WI(4)
      DIMENSION ITP(4),WK(4),ISTAGE(5),ILAY(5),CO(4,8)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C---- N IS THE NUMBER OF GRID-SUBINTERVALS IN THE PROFILE
C---- NSTAGE IS THE NUMBER OF DEFINED CROP STAGES
C---- MD IS THE TOTAL NUMBER OF DAYS TO BE SIMULATED
C---- NLAYR IS THE NUMBER OF DISTINCT SOIL TYPES IN THE PROFILE
C---- DT1 IS THE SPECIFIED TIME STEP
      READ(5,216) N,NSTAGE,MD,NLAYR,DT1
216   FORMAT(4I5,F5.1)
      NT2=2*N
      NP1=N+1
      NP2=N+2
      NM1=N-1
      NM2=N-2
C---- READ ISTAGE(I) THE LENGTH IN DAYS OF THE ITH STAGE
      READ(5,222) (ISTAGE(I),I=1,NSTAGE)
C---- NOUT CONTROLS THE NUMBER OF SOIL MOISTURE SUMMARIES OUTPUT PER DAY
C---- JWAT INDICATES WHETHER A WATER TABLE IS SPECIFIED. IF
C---- JWAT IS GREATER THAN ZERO WATER TABLE DEPTHS ARE READ
C---- IC2 CONTROLS WATER BALANCE ADJUSTMENT
C---- IF IC2 IS GREATER THAN ZERO NO ADJUSTMENT IS MADE
C---- IC3 IS USED TO SELECT BOTTOM BOUNDARY CONDITION SPECIFICATION
C---- IC3=0 THEN CONTENT IS SPECIFIED AND FLUX CALCULATED
C---- IC3=1 THEN FLUX IS SPECIFIED AND CONTENT CALCULATED
      READ(5,222) NOUT,JWAT,IC2,IC3
222   FORMAT(5I5)
      NLAY(NLAYR+1)=N+1
      READ(5,138) (R(I),I=1,N)
138   FORMAT(16F5.2)
      DO 122 I=1,NLAYR
      READ(5,132) ITP(I),FC(I),PWP(I),PAW(I),WI(I),DPTH(I),WK(I),NLAY(I)
      WRITE(7,232)ITP(I),FC(I),PWP(I),PAW(I),WI(I),DPTH(I),WK(I),NLAY(I)
122   CONTINUE
C----
      CALL PARM(ITP,NLAYR,DPTH,FC,PWP,PAW,WI,CO,WK)
C----
132   FORMAT(I2,6F6.2,I2)
232   FORMAT(1X,I2,6F6.2,I2)
C---- CALCULATE AND PRINT SOIL FUNCTIONS FOR EACH SOIL LAYER
C---- AT TEN EQUALLY SPACED WATER CONTENTS
      DO 60 I=1,NLAYR
      ILAY(I)=6*(I-1)+1
      DO 60 J=1,12
      I1=12*(I-1)+J
      DPG(I1)=(J-2)*CO(I,3)/10.
      IF(DPG(I1) .LE. 0.04)DPG(I1)=0.04
      THG(I1)=I
60    CONTINUE
      ILAY(NLAYR+1)=6*NLAYR+1
C----
      CALL FUNL(PET,CO,NLAYR,ILAY,NI,NK)
C----
      DO 234 I=1,NT2
234   HKA(I)=-HKA(I)
220   FORMAT(/9X,9HLAYER NO.,6X,20HWATER CONTENT(CC/CC),2X,16HSUCTION HE
     CAD(CM),2X,20HCONDUCTIVITY(CM/MIN),2X,22HDIFFUSIVITY(CM*CM/MIN))
      WRITE(7,220)
      DO 224 J=1,NLAYR
      J1=12*(J-1)+3
      J2=12*J
      WRITE(7,212) ((THG(I),DPG(I),HWA(I),HKA(I),DIA(I)),I=J1,J2)
224   CONTINUE
C---- CALCULATE NODE DEPTHS
      CN(1)=0.
      DO 46 I=1,N
46    CN(I+1)=CN(I)+R(I)
      WRITE(7,100)
100   FORMAT(/30X,17HNODE DEPTHS IN CM)
      WRITE(7,102) (CN(I),I=1,NP1)
102   FORMAT(12F10.2)
      IF(JWAT .LE. 0) GO TO 200
C----
      CALL WTABLE(MD,NP1)
C----
200   CONTINUE
      CO7=.04
      GP(1)=.2113249
      GP(2)=.7886750
C----
C---- INITIAL CONDITIONS
C----
      READ(5,134) (CN(I),I=1,NP1)
134   FORMAT(16F5.3)
      WRITE(7,218)
218   FORMAT(/20X,42HINITIAL WATER CONTENT AT THE NODES (CC/CC))
      WRITE(7,102) (CN(I),I=1,NP1)
      DO 4 I=1,NP1
4     DP(I)=CN(I)
      SPE=0.
      SRAE=0.
      SW=0.
      STSWIN=0.
      STRJ=0.
C---- GLOBAL MASS MATRIX
      DO 6 I=1,N2
    6 CO(I)=R(I)/6.
      DO 8 I=1,N1
    8 CD(I)=(R(I)+R(I+1))/3.
C----
      CALL METDAT(PEVAP,PRECIP,MD)
C----
      MD1=0
C---- LOOP OVER CROP STAGES
C---- READ COVER AND ROOT PARAMETERS
      DO 11 IO=1,NSTAGE
      MD2=ISTAGE(IO)
C----
```

```
      CALL ROOTDN(GP,N,COVER,ROOTEF)
C----
C---- DAILY INCREMENT LOOP
      DO 11 JDL=1,MD2
      MD1=MD1+1
      PE=PEVAP(MD1)
      W=PRECIP(MD1)
      TRU=0.
      TSAE=0.
      TSWIN=0.
      SAE=0.
      SWIN=0.
      TFLB=0
      SUNR=6.
      SUNS=18.
      WST=0.
      WEND=24.
      CNM=(CN(1)+CN(2)+CN(3))/3.
      WJDL=W
      DT=DT1
      IF(WJDL .LT. .5 .AND. CNM .LE. FC(1)) GO TO 124
      IF(CNM .LT. FC(1)) DT=.5*DT
      IF(CNM .LT. PWP(1))D1=.5*DT
      GO TO 126
124   IF(CNM .LT. PWP(1)) DT=2.*DT
126   CONTINUE
      MP=1440./DT
      JPP=MP/NOUT
C----
C---- PERIOD INCREMENT LOOP
C----
      JP=0
      DO 10 J1=1,MP
      XP=0
      DO 80 I=1,N
80    XP=XP+.5*R(I)*(CN(I)+CN(I+1))
      JP=JP+1
      KPC=0
C----
      CALL PETFIT(PE,W,DT,SUNR,SUNS,WST,WEND,PET,J1)
C----
3     CONTINUE
      DO 12 I=1,NM1
      AU(I)=0
      AD(I)=0
   12 S(I)=0
      DO 150 I=1,NLAYR
      CO3=CO(I,3)
      NMIN=NLAY(I)+1
      NMAX=NLAY(I+1)
      IF(I .EQ. 1) NMIN=1
      DO 150 J=NMIN,NMAX
      IF(DP(J) .LT. CO7) DP(J)=CO7
      IF(DP(J) .GT. CO3) DP(J)=CO3
150   CONTINUE
C---- SET NODES BELOW WATER TABLE TO SATURATION
      IF(JWAT .LE. 0) GO TO 206
      DO 208 I=1,NLAYR
      CO3=CO(I,3)
      NMIN=NLAY(I)+1
      NMAX=NLAY(I+1)
```

```
1820           IF(I .EQ. 1) NMIN=1
1830           DO 208 J=NMIN,NMAX
1840           DP(J)=CO3
1850           CN(J)=CO3
1860     208   CONTINUE
1870     206   CONTINUE
1880           DO 204 I=1,N
1890           DO 204 J=1,2
1900           I1=2*(I-1)+J
1910           Y=GP(J)
1920     204   DPG(I1)=DP(I)*(1-Y)+DP(1+1)*Y
1928     C----
1930           CALL FUNL(PET,CO,NLAYR,NLAY,WI,WK)
1932     C----
1940     202   CONTINUE
1950           A1=0
1960           A2=0
1970           DO 42 I=1,NT2
1980     42    ZAE(I)=0.
1990           IF(PET .LE. 0.) GO TO 72
2000           IF(COVER .LE. 0.) GO TO 72
2010     C----
2020           CALL ROOTUP(N,COVER,PET,KPC,DT,TPU,UT3,ROOTEF)
2030     C----
2040     72    CONTINUE
2050           IF(NLAYR .LE. 1) GO TO 230
2058     C----
2060           CALL DISCON(CO,NLAYR,NLAY,WI,WK)
2062     C----
2070     230   CONTINUE
2090     C---- ELEMENT INTEGRATION
2110           Z=2*(DP(1)-CN(1))/DI
2120           H=R(1)
2130           A3=0.
2140           DO 14 I=1,2
2150           Y=GP(I)
2160           DI =DIA(I)
2170           HI=HKA(I)
2180           A3=A3+.5*H*Y*ZAE(I)
2190           A1=A1-.5*(Z*Y*(1.-Y)*H-DI*DP(1)/H+HI)
2200        14 A2=A2+.5*DI/H
2210           S(1)=A1-A3
2220           AD(1)=A2
2230           DO 16 I=2,NM1
2240           A1=0
2250           A2=0
2260           A3=0.
2270           H=R(I)
2280           DO 18 J=1,2
2290           T1=2*(I-1)+J
2300           A1=A1+.5*DIA(I1)
2310           A3=A3+.5*GP(J)*H*ZAE(I1)
2320     18    A2=A2+.5*HKA(I1)
2330           I1=I-1
2340           S(T1)=S(T1)+A2-A3
2350           S(I)=-A2-A3
2360           AD(I1)=AD(I1)+A1
2370           AD(I)=A1
2380        16 AU(I1)=-A1
2390           A1=0
2400           A2=0
```

```
         A3=0.
         Z=2*(DP(NP1)-CN(NP1))/DT
         H=R(N)
         DO 20 I=1,2
         Y=GP(I)
         I1=2*NM1+1
         DI=DIA(I1)
         HI=HKA(I1)
         A3=A3+Y*H*ZAE(I1)
         A1=A1-.5*(Z*Y*(1.-Y)*H-DI*DP(NP1)/H-HI)
      20 A2=A2+.5*DI/H
         S(NM1)=S(NM1)+A1-A3
         AD(NM1)=AD(NM1)+A2
   C----
   C---- IMPLICIT TIME STEP
   C----
         DO 22 I=1,NM2
         X=CU(I)/DT+.5*AU(I)
         Y=CU(I)/DT-.5*AU(I)
         AU(I)=X
      22 BU(I)=Y
         DO 24 I=1,NM1
         X=.5*AD(I)+CD(I)/DT
         Y=CD(I)/DT-.5*AD(I)
         AD(I)=X
      24 BD(I)=Y
   C----
   C---- TRIDIAGONAL GAUSSIAN ELIMINATION
   C----
         CP(2)=BD(1)*CN(2)+BU(1)*CN(3)+S(1)
         CP(N)=BU(NM2)*CN(NM1)+BD(NM1)*CN(N)+S(NM1)
         DO 26 I=3,NM1
      26 CP(I)=BU(I-2)*CN(I-1)+BD(I-1)*CN(I)+BU(I-1)*CN(I+1)+S(I-1)
         S(1)=AU(1)/AD(1)
         DO 28 I=2,NM2
      28 S(I)=AU(I)/(AD(I)-AU(I-1)*S(I-1))
         CP(2)=CP(2)/AD(1)
         DO 30 I=3,N
      30 CP(I)=(CP(I)-AU(I-2)*CP(I-1))/(AD(I-1)-AU(I-2)*S(I-2))
         CS(N)=CP(N)
         DO 32 I=1,NM2
         L=N-I
      32 CS(L)=CP(L)-S(L-1)*CS(L+1)
   C---- CALCULATE HI AND DI FOR EVAPORATION
         HI=.5*(HKA(2)+HKA(3))
         DI=.5*(DIA(2)+DIA(3))
   C---- CALCULATE HI AND DI FOR PRECIPITATION
         IF(W .LE. PE) GO TO 228
         HI=.5*(HKA(1)+HKA(1))
         DI=.5*(DIA(1)+DIA(1))
   228   CONTINUE
         CO3=CO(1,3)
   C----
         CALL BCON(DT,SAE,HI,DI,PET,SWIN,CO3,COVER)
   C----
   C---- SET BOTTOM BOUNDARY
   C---- CS(NP1)=DP(NP1)
         CS(NP1)=CS(N)
   C----
         DO 154 I=1,NLAYR
         CO3=CO(I,3)
      NMIN=NLAY(I)+1
      NMAX=NLAY(I+1)
      IF(I .EQ. 1)NMIN=1
      DO 154 J=NMIN,NMAX
      IF(CS(J) .GT. CO3) CS(J)=CO3
154   IF(CS(J) .LT. CO7) CS(J)=CO7
C----
C---- CHECK FOR PREDICTOR CORRECTOR OR EXTRAPOLATION
C---- CORRECTOR STEP
C----
      IF(KPC .GE. 1) GO TO 33
      KPC=KPC+1
      DO 56 I=1,NP1
56    DP(I)=(CS(I)+CN(I))/2.
      GO TO 3
C---- COMPLETE CALCULATIONS AND THEN START NEW TIME STEP
33    CONTINUE
      BOTC=.5*R(N)*(CN(N)+CN(NP1))
      DO 36 I=1,NP1
      DP(I)=1.5*CS(I)-.5*CN(I)
   36 CN(I)=CS(I)
      TSAE=TSAE+SAE
      TSWIN=TSWIN+SWIN
      RAF=TSAE+TRU
C----
C---- BOTTOM BOUNDARY CONDITION
C---- DETERMINE APPROPRIATE BOTTOM MOISTURE CONTENT FOR SPECIFIED BOTTOM
C---- BOUNDARY CONDITION
C---- BBC(I) IS THE BOTTOM BOUNDARY CONDITION FOR DAY I EITHER WATER
C---- CONTENT(CC/CC) OR FLUX(CM/MIN). AN ALTERNATIVE IS TO ASSUME ZERO
C---- GRADIENT ,I.E.,CN(N)=CN(NP1)
C----
      IF(IC3 .GT. 2) GO TO 84
      H=R(N)
      DB=.5*(DIA(NT2-1)+DIA(NT2))
      HI=.5*(HKA(NT2-1)+HKA(NT2))
      IF(IC3 .GT. 1) GO TO 86
C----
C----GIVEN CONTENT ,CALCULATE FLUX
C---- -VE FLUX DOWN +VE UPWARD
C----
C---- CN(NP1)=BBC(MD1)
      FLB=DB*(CN(N+1)-CN(N))/H+HI
      FLBP=FLB*DT
      TFLB=TFLB+FLBP
      GO TO 84
C----
C---- GIVEN FLUX ,CALCULATE CONTENT
C----
86    CONTINUE
C---- FLB=BBC(MD1)
      CN(NP1)=CN(N)-H*(FLB+HI)/DB
      FLBP=FLB*DT
      TFLB=TFLB+FLBP
84    CONTINUE
C----
C----  MOISTURE IN PROFILE
C----
      X=(CN(1)*R(1)+CN(NP1)*R(N))/2.
      DO 44 I=2,N
44    X=X+CN(I)*R(I)
```

```
      XP=XMOIST
      JPR=JDL*J1
      IF(JPR .EQ. 1) XP=X
      XMOIST=X
      IF(IC2 .GT. 0) GO TO 82
C----
C----CORRECTION FOR MOISTURE AND FLUX DIFFERENCE
C----ASSUME WE CAN NEGLECT FLUX THRU BOTTOM
C----
      Y=TFLB*TFLB
      IF(Y .GT. 0.0025) GO TO 82
      DX=X-XP
      DPTT=R(1)+R(2)+.5*R(3)
      DF=SWIN-DX
      TF=SAE+UT3
      IF(PET .GT. 0.) DF=-TF-DX
      XMOIST=XMOIST+DF
      TDF=DF/DPTT
      TDFF=TDF*TDF
      IF(TDFF .GT. .0001)TDF=.01*TDF/(TDFF**.5)
      CN(1)=CN(1)+TDF
      CN(2)=CN(2)+TDF
      CN(3)=CN(3)+TDF
      CO3=CO(1,3)
      IF(CN(1) .GT. CO3) CN(1)=CO3
      IF(CN(1) .LT. CO7) CN(1)=CO7
      IF(CN(2) .GT. CO3) CN(2)=CO3
      IF(CN(2) .LT. CO7) CN(2)=CO7
82    CONTINUE
      IF(JP .NE.JPP) GO TO 10
      JP=0
      TIMJ1=J1*DT/60.
      WRITE(7,62)MD1,TIMJ1
      WRITE(6,62)MD1,TIMJ1
62    FORMAT(/1X,3HDAY,I10,5X,4HHOUR,F12.2)
      WRITE(7,66) XMOIST
66    FORMAT(/1X,16HWATER IN PROFILE,F10.2,2X,2HCM)
64    FORMAT(/1X,33HWATER CONTENT AT THE NODES(CC/CC))
      WRITE(7,64)
      WRITE(7,38) (CN(I),I=1,NP1)
      WRITE(6,38) (CN(I),I=1,NP1)
      WRITE(7,116) TFLB
   10 CONTINUE
      WRITE(7,140) IO,JDL,MD1
210   FORMAT(/3X,5HLAYER,3X,13HTHICKNESS(CM),2X,15HAV MOIST(CC/CC),2X,28
     CHWATER CONTENT(PERCENT AVAIL))
140   FORMAT(//1X,5HSTAGE,I10,4X,9HSTAGE DAY,I10,4X,7HDAY NO.,I10)
      WRITE(7,210)
      DO 146 I=1,NLAYR
      NMIN=NLAY(I)
      NMAX=NLAY(I+1)-1
      XWAT=0.
      DO 142 J=NMIN,NMAX
      I1=2*(J-1)
142   XWAT=XWAT+R(J)*(DPG(I1+1)+DPG(I1+2))/2.
      AXW=XWAT/DPTH(I)
      PAXW=(AXW-PWP(I))/(FC(I)-PWP(I))
      PAXW=PAXW*100.
      WRITE(7,144) I,DPTH(I),AXW,PAXW
146   CONTINUE
144   FORMAT(I5,3F16.5)
```

```
      SPE=SPE+PE
      SRAE=SRAE+RAE
      SW=SW+W
      STSWIN=STSWIN+TSWIN
      STRU=STRU+TRU
      WRITE(7,48)
      WRITE(7,50)
48    FORMAT(/14X,17HDAILY VALUES (CM),18X,22HCUMULATIVE VALUES (CM))
50    FORMAT(/4X,2HPE,5X,2HAE,5X,5HTRANS,2X,6HPRECIP,2X,6HINFILT,4X,2HPE
     C,6X,2HAE,4X,5HTRANS,2X,6HPRECIP,2X,6HINFILT)
      WRITE(6,52) PE,RAE,TRU,W,TSWIN,SPE,SRAE,STRU,SW,STSWIN
      WRITE(7,52) PE,RAE,TRU,W,TSWIN,SPE,SRAE,STRU,SW,STSWIN
52    FORMAT(10F8.3)
      WRITE(7,66) XMOIST
      WRITE(6,66) XMOIST
      IF(IC3 .GT. 0) GO TO 11
      WRITE(7,116) TFLB
116   FORMAT(/1X,45HFLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT),E12.4,
     C3X,2HCM)
      WRITE(7,214)
214   FORMAT(/9X,9HDEPTH(CM),6X,20HWATER CONTENT(CC/CC),2X,16HSUCTION HE
     CAD(CM),2X,20HCONDUCTIVITY(CM/MIN),2X,22HDIFFUSIVITY(CM*CM/MIN))
      DO 118 I=1,NT2
118   HKA(I)=-HKA(I)
      WRITE(7,212) ((THG(I),DPG(I),HWA(I),HKA(I),DTA(I)),I=1,NT2)
212   FORMAT(5E20.4)
11    CONTINUE
   38 FORMAT(12E10.4)
39    FORMAT(1I5)
      STOP
      END
C
C
C
      SUBROUTINE PARM(ITP,NLAYR,DPTH,FC,PWP,PAW,WS,CO,WK)
      DIMENSION ITP(4),DPTH(4),FC(4),PWP(4),WS(4),CO(4,8),PAW(4),WK(4)
C-----
C----- PARAMETER AND FUNCTION SPECIFICATION FOLLOW CLAPP AND HORNBERGER
C----- CO1 IS THE EMPIRICAL EXPONENT B
C----- CO2 IS THE "SATURATION " SUCTION (LOG AVERAGE)
C----- CO3 IS THE SATURATED WATER CONTENT
C----- CO4 IS THE SATURATED HYDRAULIC CONDUCTIVITY
C----- CO5,CO6 ARE EMPIRICAL COEFFICIENTS IN THE PARABOLA FIT TO THE SATURATION
C----- END OF THE SOIL-WATER SUCTION HEAD FUNCTION
C----- WI IS THE INFLECTION POINT ON THE SOIL-WATER SUCTION HEAD FUNCTION
C----- WKI IS THE INFLECTION POINT ON THE HYDRAULIC CONDUCTIVITY FUNCTION
C-----
      SFC=344.
      SPWP=15000.
      FCK=.00001
      DO 80 I=1,NLAYR
      WKI=WK(I)
      WI=WS(I)
      ITYPE=ITP(I)
      WRITE(7,120)
120   FORMAT(/2X,5HLAYER,2X,13HTHICKNESS(CM),2X,19HAVAILABLE WATER(CM),2
     CX,16HFIELD CAP(CC/CC),2X,15HP WILT P(CC/CC))
      GO TO (2,4,6,8,10,12,14,16,18,20,22,24),ITYPE
2     CO1=4.05
      CO2=3.5
      CO3=.395
```

```
            CO4=1.056
            GO TO 50
    4       CO1=4.38
            CO2=1.78
            CO3=.410
            CO4=.938
            GO TO 50
    6       CO1=4.90
            CO2=7.18
            CO3=.435
            CO4=.208
            GO TO 50
    8       CO1=5.30
            CO2=56.6
            CO3=.485
            CO4=.0432
            GO TO 50
    10      CO1=5.39
            CO2=14.6
            CO3=.451
            CO4=.0417
            GO TO 50
    12      CO1=7.12
            CO2=8.63
            CO3=.420
            CO4=.0378
            GO TO 50
    14      CO1=7.75
            CO2=14.6
            CO3=.477
            CO4=.0102
            GO TO 50
    16      CO1=8.52
            CO2=36.1
            CO3=.476
            CO4=.0147
            GO TO 50
    18      CO1=10.4
            CO2=6.16
            CO3=.426
            CO4=.0130
            GO TO 50
    20      CO1=10.4
            CO2=17.4
            CO3=.492
            CO4=.0062
            GO TO 50
    22      CO1=11.4
            CO2=18.6
            CO3=.482
            CO4=.0077
            GO TO 50
    24      READ(5,124) CO1,CO2,CO3,CO4
    124     FORMAT(4F9.6)
    50      CONTINUE
    C----
    C----   ADJUST CO2 TO FIT A SPECIFIED PLANT AVAILABLE WATER, IF THE
    C----   SPECIFIED LEVEL IS LESS THAN OR EQUAL TO ZERO,NO ADJUSTMENT IS MADE
    C----
            CAP=PAW(I)/DPTH(1)
            IF(CAP .LE. 0.) GO TO 60
```

```
      X=1./C01
      Y=1.-(SFC/SPWP)**X
      C02= SFC*(CAP/(C03*Y))**C01
      Z=C03*(C02/SFC  )**X
      IF(Z .GT. WI*C03) C02=SFC *WI**C01
60    CONTINUE
C----
C---- ADJUST C01 AND C02 TO FIT THE SOIL-WATER SUCTION HEAD FUNCTION
C---- THROUGH A SPECIFIED PERMANENT WILTING POINT AND FIELD CAPACITY
C---- IF THE SPECIFIED FIELD CAPACITY IS LESS THAN OR EQUAL TO ZERO
C---- NO ADJUSTMENT IS MADE
C----
      CFC=FC(I)
      IF(CFC .LE. 0.) GO TO 70
      CPWP=PWP(I)
      X=SPWP/SFC
      W0=CPWP/C03
      W1=CFC/C03
      Y=W1/W0
      C01=ALOG(X)/ALOG(Y)
      C02=SPWP*W0**C01
70    CONTINUE
      PI=C02*WI**(-C01)
      X=1-WI
      C05=PI*(WI-X*C01)/(WI*X*X)
      C06=2*WI-1-PI*C01/(C05*WI)
      C0(I,1)=C01
      C0(I,2)=C02
      C0(I,3)=C03
      C0(I,4)=C04
      C0(I,5)=C05
      C0(I,6)=C06
      C0(I,7)=C07
      C0(I,8)=C08
      A1=1./C01
C----
C---- CALCULATE FIELD CAPACITY AND PERMANENT WILTING POINT
C----
      FC(I)=C03*(C02/SFC  )**A1
      PWP(I)=C03*(C02/SPWP   )**A1
      PAW(I)=DPTH(I)*(FC(I)-PWP(I))
C----
C---- SET NEW COEFFICIENT IN HYDRAULIC CONDUCTIVITY,C07,TO FORCE FUNCTION
C---- THROUGH A SPECIFIED POINT.THE HYDRAULIC CONDUCTIVITY IS FIT WITH
C---- A PARABOLA BETWEEN WKI AND SATURATION SUCH THAT THE SATURATED HYDRAULIC
C---- CONDUCTIVITY IS AS SPECIFIED.IF WKI IS GREATER THAN OR EQUAL TO ONE
C---- NO ADJUSTMENT IS MADE
C----
      C07=C04
      IF(WKI .GE. 1.) GO TO 75
      X=FC(I)/C03
      Y=-(2.*C01+3.)
      C07=FCK*X**Y
      IF(C07 .GT. C04) C07=C04
75    CONTINUE
      C0(I,7)=C07
      WRITE(7,122) I,DPTH(I),PAW(I),FC(I),PWP(I)
122   FORMAT(I5,4F16.4)
80    CONTINUE
      WRITE(7,128)
128   FORMAT(/25X,22HCOEFFICIENTS FOR LAYER)
```

```
6050          WRITE(7,126)
6060    126   FORMAT(4X,3HCO1,9X,3HCO2,9X,3HCO3,9X,3HCO4,9X,3HCO5,9X,3HCO6,9X,3
6070         CHCO7,9X,3HCO8)
6080          WRITE(7,38) ((CO(1,J),J=1,8),I=1,NLAYR)
6090    38    FORMAT(8E12.4)
6100          RETURN
6110          END
6112    C
6114    C
6116    C
6120          SUBROUTINE WTABLE(ND,NP1)
6130          DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
6140         1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
6150          COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
6160    C----
6170    C---- GIVEN WATER TABLE DEPTH (DTABLE(I)) ON DZY I, THIS PROGRAM DETERMINES
6180    C---- THE INDEX OF THE FIRST NODE LYING WITHIN THE WATER TABLE AND
6190    C---- STORES THE RESULT IN DTABLE(I)
6200    C----
6210          READ(5,5) (DTABLE(I),I=1,ND)
6220          WRITE(7,5) (DTABLE(I),I=1,ND)
6230          DO 10 I=1,ND
6240          DO 20 J=1,NP1
6250          J1=NP1-(J-1)
6260          IF(DTABLE(I) .LT. CN(J1)) GO TO 20
6270          DTABLE(I)=J1
6280          GO TO 10
6290    20    CONTINUE
6300    10    CONTINUE
6310    5     FORMAT(10F7.2)
6320          RETURN
6330          END
6332    C
6334    C
6336    C
6340          SUBROUTINE METDAT(PEVAP,PRECIP,ND)
6350          DIMENSION PEVAP(100),PRECIP(100)
6360          IMET=2
6370          GO TO (2,4),IMET
6380    C----
6390    C---- READ PE AND PRECIP
6400    C----
6410    2     DO 6 I=1,ND
6420          READ(5,58) PEVAP(I),PRECIP(I)
6430          WRITE(7,58) PEVAP(I),PRECIP(I)
6440    6     CONTINUE
6450    58    FORMAT(2F5.2)
6460          GO TO 10
6470    C----
6480    C---- GENERATE PE AND PRECIP FROM BASIC WEATHER RECORDS
6490    C----
6500    4     CONTINUE
6510          DO 12 I=1,ND
6520          PEVAP(I)=.7
6530          PRECIP(I)=0.
6540    12    CONTINUE
6550          DO 14 I=1,2
6560          I1=10*(I-1)+1
6570    14    PRECIP(I1)=3.
6580          PRECIP(1)=0.
6590    10    CONTINUE
```

```
      RETURN
      END
C
C
C
      SUBROUTINE ROOTDN(GP,N,COVER,ROOTEF)
      DIMENSION GP(2),X(50),Y(50)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C----
C---- THIS SUBROUTINE GENERATES THE ROOT DENSITY AT GAUSS POINTS WITHIN
C---- GRID SUBINTERVALS
C---- THG(I) IS THE LOCATION OF THE ITH GAUSS POINT
C---- RDF(I) IS THE ROOT DENSITY (GM PER CUBIC CM) AT THG(I)
C---- R(I) IS THE THICKNESS OF THE ITH GRID SUBINTERVAL (CM)
C----
      READ(5,100) IROOT,ROOTEF,COVER
  100 FORMAT(I3,2F4.2)
      TH=0.
      DO 2 I=1,N
      H=R(I)
      DO 4 J=1,2
      I1=2*(I-1)+J
    4 THG(I1)=TH+GP(J)*H
    2 TH=TH+R(I)
      IF(COVER .LE. 0.) GO TO 14
      N2=2*N
      GO TO (6,8),IROOT
    6 READ(5,102)A,B
      DO 10 I=1,N2
   10 RDF(I)=A*EXP(-B*THG(I))
      GO TO 50
  102 FORMAT(2F10.2)
    8 M=0
   12 M=M+1
      READ(5,102) DEPTH,RDEN
      X(M)=DEPTH
      Y(M)=RDEN
      IF(DEPTH .GE. 0.) GO TO 12
      MAX=M-1
C----
      CALL INTERP(THG,RDF,X,Y,MAX,N2)
C----
   50 CONTINUE
      WRITE(7,104)
  104 FORMAT(/1X,40HROOT DENSITY (GM PER CC) AT GAUSS POINTS)
      WRITE(7,106)
  106 FORMAT(/3X,16HDEPTH      DENSITY)
      DO 14 I=1,N2
      WRITE(7,102) THG(I),RDF(I)
   14 CONTINUE
      RETURN
      END
C
C
C
      SUBROUTINE PETFIT(PE,W,DT,SUNR,SUNS,WST,WEND,PET,J1)
C----
C---- PE IS DAILY POTENTIAL EVAPOTRANSPIRATION IN CM
C---- W IS RAINFALL IN CM
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```
C---- SUNR,SUNS ARE TIMES OF SUNRISE AND SUNSET IN HOURS
C---- WST,WEND ARE TIMES OF START AND END OF RAINFALL IN HOURS
C---- PET IS POTENTIAL SURFACE FLUX IN CM PER MIN FOR TIME PERIOD J1
C----
      DAYL=SUNS-SUNR
      TIME=J1*DT/60.
      PET=0.
      PET1=0.
      PET2=0.
      IF(PE .LE. 0.)GO TO 5
      IF(TIME .LT. SUNR .OR. TIME .GT. SUNS) GO TO 5
      PET1=1.5708*PE*SIN(3.14159*((TIME-SUNR)/DAYL))/(60.*DAYL)
5     IF(W .LE. 0.) GO TO 10
      IF(TIME .LT. WST .OR. TIME .GT. WEND) GO TO 10
      PET2=-W/((WEND-WST)*60.)
10    CONTINUE
      PET=PET1+PET2
      RETURN
      END
C
C
C
      SUBROUTINE ROOTUP(N,COVER,PET,KPC,DT,TRU,UT3,ROOTEF)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C----
C---- ZAE IS ROOT WATER UPTAKE AT GAUSS POINTS
C---- UT3 IS THE ROOT WATER UPTAKE FOR THE PROFILE IN TIME DT
C---- TRU IS THE CUMULATIVE TOTAL ROOT WATER UPTAKE PER DAY
C----
      RP=15000
      DO 70 I=1,50
70    ZAE(I)=0.
15    UT=0.
      DO 13 I=1,N
      H=R(I)
      DO 13 J=1,2
      I1=2*(I-1)+J
      ZAE(I1)=HKA(I1)*(HWA(I1)-RP)*RDF(I1)*ROOTEF
C---- ZERO UPTAKE FOR LIMITING OXYGEN
      IF(HWA(I1) .LT. 50.)ZAE(I1)=0.
      IF(ZAE(I1) .LT. 0.) ZAE(I1)=0.
      UT=UT+.5*ZAE(I1)*H
      X=-COVER*PET
      IF(-UT .LT. X) GO TO 19
      GO TO 13
19    UT=UT-.5*ZAE(I1)*H
      IF(UT .LT. 0.) UT=0.
      ZAE(I1)=-(X+UT)/(.5*H)
      GO TO 17
13    CONTINUE
C----
C---- CHECK FOR PREDICTOR CORRECTOR AND SET UT3 AND TRU IF ON CORRECTOR
C----
17    IF(KPC .NE. 1) GO TO 72
      UT3=0.
      DO 74 I=1,N
      H=R(I)
      DO 74 J=1,2
      I1=2*(I-1)+J
```

```
 74     UT3=UT3+ZAE(I1)*H*DT*.5
        TRU=UT3+TRU
 72     CONTINUE
        RETURN
        END
C
C
C
        SUBROUTINE FUNL(PET,CO,NLAYR,NLAY,WS,WK)
        DIMENSION Y(2),WS(4),CO(4,8),NLAY(5),WK(4)
        DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CW(25),DP(25),
       1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
        COMMON PEVAP,PRECIP,DTABLE,CS,CW,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
        JMIN=1
        DO 50 I=1,NLAYR
        WK1=WK(I)
        WI=WS(I)
        CO1=CO(I,1)
        CO2=CO(I,2)
        CO3=CO(I,3)
        CO4=CO(I,4)
        CO5=CO(I,5)
        CO6=CO(I,6)
        CO7=CO(I,7)
        CO8=CO(I,8)
        NMIN=NLAY(I)
        NMAX=NLAY(I+1)
        IF(I .EQ. NLAYR) NMAX=NLAY(I+1)-1
        DO 40 J=NMIN,NMAX
        DO 45 J1=JMIN,2
        I1=2*(J-1)+J1
        X=DPG(I1)
        X=X/CO3
        IF(X .GT. 1.)X=1.
C-----
C----- ENTER ALTERNATE HYDRAULIC CONDUCTIVITY FUNCTION (CM PER MIN) USING
C----- CO(I,J) TO SPECIFY COEFFICIENTS IF REQUIRED THEN GO TO 60
C----- NOTE THAT X IN THIS SUBROUTINE IS THE VOLUMETRIC WATER CONTENT DIVIDED
C----- BY THE SATURATED WATER CONTENT
C-----
        HK1=CO7*X**(2.*CO1+3.)
        IF(X .LE. WK1) GO TO 60
        IF(WK1 .GE. 1.)GO TO 60
        Z=(X-WK1)/(1.-WK1)
        HK1=HK1+(CO4-CO7)*Z*Z
 60     CONTINUE
        HK1=-HK1
C-----
C----- ENTER ALTERNATE SOIL-WATER SUCTION HEAD FUNCTION (CM) AND ITS DERIVATIVE
C----- USING CO(I,J) TO SPECIFY COEFFICIENTS IF REQUIRED THEN GO TO 30
C-----
        IF(X .GT. WI) GO TO 20
        HW1=CO2/(X**CO1)
        DERIV=CO1*CO2/(CO3*X**(CO1+1))
        GO TO 30
 20     CONTINUE
        HW1=CO5*(X-CO6)*(1-X)
        DERIV=CO5*(2.*X-(CO6+1))/CO3
 30     CONTINUE
        DIA(I1)=-HK1*DERIV
        HWA(I1)=HW1
        HKA(I1)=HK1
45      CONTINUE
        JMIN=1
40      CONTINUE
        JMIN=2
50      CONTINUE
        RETURN
        END
C
C
C
        SUBROUTINE DISCON(CO,NLAYR,NLAY,WS,WK)
        DIMENSION Y(2),WS(4),CO(4,8),NLAY(5),WK(4)
        DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
       1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
        COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C-----
C-----  ADJUST FOR CHANGE IN SUCTION HEAD FUNCTION (CM)
C-----  XAV DENOTES A MEAN STANDARDIZED WATER CONTENT FOR THE INTERFACE LAYER
C-----  DERIV DENOTES THE CHANGE IN SUCTION HEAD FOR FIXED XAV ACROSS
C-----  THE INTERFACE LAYER
C-----
        DO 70 I=2,NLAYR
        I1=I-1
        J1=NLAY(I)
        J2=2*J1-1
        J3=J2+1
        XAV=.5*(DPG(J2)/CO(I1,3)+DPG(J3)/CO(I,3))
        I2=1
        DO 74 J=I1,I
C-----
C-----  ENTER ALTERNATE SOIL WATER SUCTION HEAD FUNCTION (CM)
C-----  EVALUATE ALTERNATE FUNCTION THEN GO TO 78
C-----
        WI=WS(J)
        WI=1.
        IF(XAV .GT. WI)GO TO 80
        Y(I2)=CO(J,2)/(XAV**CO(J,1))
        GO TO 78
80      Y(I2)=CO(J,5)*(XAV-CO(J,6))*(1.-XAV)
        IF(Y(I2) .LT. 0.)Y(I2)=0.
78      CONTINUE
        I2=I2+1
74      CONTINUE
        DERIV=(Y(2)-Y(1))/R(J1)
        Z=1.+DERIV
        DO 90 J=J2,J3
        Z1=HKA(J)
        Z1=Z1*Z
        Z2=Z1*Z1
        IF(Z2 .GT. 100.)Z1=10.*Z1/(Z2**.5)
        HKA(J)=Z1
90      CONTINUE
70      CONTINUE
95      CONTINUE
        RETURN
        END
C
C
C
        SUBROUTINE BCON(DT,SAE,HI,DI,PET,SWIN,CO3,COVER)
```

```
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C----
C---- PET +VE FOR EVAP, -VE FOR PRECIP
C---- SAE IS AE FOR PERIOD DT (+VE)
C---- SWIN IS ACTUAL PRECIP ENTERING SOIL FOR DT (+VE)
C----
      ISURF=1
      IF(PET .GE. 0.)ISURF=0
      C07=.04
      IF(CS(2) .GT. C03)CS(2)=C03
      IF(CS(2) .LT. C07)CS(2)=C07
      H=R(1)
      SAE=0.
      SWIN=0.
      PETS=PET
      IF(PET .GE. 0.) PET=(1.-COVER)*PET
1     CONTINUE
      I1=0
      IF(PET .GT. 0) I1=1
    8 TT=-PET
C----
C---- SELECT FLUX-CONCENTRATION BOUNDARY OR IMAGINARY LAYER ROUTINE
C----
      IF(ISURF .GT.0) GO TO 16
C---- CALCULATION OF CS(1) FOR  EVAP OR PRECIP
C---- ASSUME CS(1) IN OPEN INTERVAL (C07,C03)
      CS(1)=H*(TT+HI)/DI+CS(2)
      IF(CS(1) .GT. C03 ) GO TO 10
      IF(CS(1) .LT. C07) GO TO 14
      IF(I1 .EQ. 1) SAE=     PET*DT
      IF(I1 .EQ. 0) SWIN =     -PET*DT
      GO TO 12
   10 FLUX=DI*(DP(2)-C03 )/H+HI
      TT=PET
      TT2=TT*TT
      FLUX2=FLUX*FLUX
      IF(FLUX2 .GE. TT2) FLUX=TT
      IF(I1 .EQ. 1) SAE=     FLUX*DT
      IF(I1 .EQ. 0) SWIN=     -FLUX*DT
      GO TO 12
   14 FLUX=DI*(DP(2)-C07)/H+HI
      IF(I1 .EQ. 1) SAE=     FLUX*DT
      IF(I1 .EQ. 0) SWIN =     -FLUX*DT
   12 CONTINUE
      IF(CS(1) .LE. C07) CS(1)=C07
      IF(CS(1) .GE. C03 ) CS(1)=C03
      GO TO 30
C----
C---- IMAGINARY LAYER ROUTINE (.5 H THICK)
C----
16    CONTINUE
      SC=CN(1)*.5*H
      C03=C03*.5*H
      C07=C07*.5*H
      F2=DI*(DP(2)-DP(1))/H+HI
      SCN=SC+(TT+F2)*DT
      F1=TT
      IF(SCN .LT. C07) GO TO 18
      GO TO 20
```

```
9370    18      SCN=CO7
9380            F1=(SCN-SC)/DT-F2
9390            GO TO 24
9400    20      IF(SCN .GT. CO3 ) GO TO 22
9410            GO TO 24
9420    22      SCN=CO3
9430            F1=(SCN-SC)/DT-F2
9440    24      CONTINUE
9450            CS(1)=SCN/(.5*H)
9460            F12=F1*F1
9470            TT2=TT*TT
9480            IF(F12 .GT. TT2) F1=TT
9490            IF(T1 .EQ. 0) SWIN=F1*DT
9500            IF(I1 .EQ. 1) SAE=-F1*DT
9510            CC3=CO3/(.5*H)
9520    30      CONTINUE
9530            PET=PETS
9540            RETURN
9550            END
9552    C
9554    C
9556    C
9560            SUBROUTINE INTERP(XINTRP,CINTRP,X,Y,N,M)
9570            DIMENSION CINTRP(50),XINTRP(50),X(50),Y(50)
9580            NM1=N-1
9590            I=1
9600            DO 20 J=1,NM1
9610    30      CONTINUE
9620            IF(XINTRP(I) .GT. X(J+1)) GO TO 20
9630            XO=(XINTRP(I)-X(J))/(X(J+1)-X(J))
9640            CINTRP(I)=Y(J)+(Y(J+1)-Y(J))*XO
9650            I=I+1
9660            IF(I .GT. M) GO TO 40
9670            GO TO 30
9680    20      CONTINUE
9690    40      RETURN
9700            END
```

```
 6  0.00   0.00   0.00   0.92 30.00   0.90 1
11  0.00   0.00   0.00   0.92 90.00   0.90 8

 LAYER   THICKNESS(CM)   AVAILABLE WATER(CM)   FIELD CAP(CC/CC)   P WILT P(CC/CC)
   1           30.0000           3.0901              0.2503           0.1473

 LAYER   THICKNESS(CM)   AVAILABLE WATER(CM)   FIELD CAP(CC/CC)   P WILT P(CC/CC)
   2           90.0000           9.4678              0.3732           0.2680

                                 COEFFICIENTS FOR LAYER
   C01          C02          C03          C04          C05          C06          C07          C08
0.7120E+01   0.8630E+01   0.4200E+00   0.3780E-01   0.9299E+03   0.7100E+00   0.3780E-01   0.0000E+00
0.1140E+02   0.1860E+02   0.4820E+00   0.7700E-02   0.6538E+02  -0.8280E+01   0.7371E-02   0.0000E+00

       LAYER NO.        WATER CONTENT(CC/CC)   SUCTION HEAD(CM)   CONDUCTIVITY(CM/MIN)   DIFFUSIVITY(CM*CM/MIN)
        0.1000E+01             0.4200E-01           0.1138E+09           0.2175E-18             0.4195E-08
        0.1000E+01             0.8400E-01           0.8179E+06           0.3367E-13             0.2334E-05
        0.1000E+01             0.1260E+00           0.4559E+05           0.3656E-10             0.9421E-04
        0.1000E+01             0.1680E+00           0.5880E+04           0.5212E-08             0.1299E-02
        0.1000E+01             0.2100E+00           0.1200E+04           0.2442E-06             0.9939E-02
        0.1000E+01             0.2520E+00           0.3278E+03           0.5660E-05             0.5242E-01
        0.1000E+01             0.2940E+00           0.1094E+03           0.8072E-04             0.2138E+00
        0.1000E+01             0.3360E+00           0.4227E+02           0.5066E-03             0.7226E+00
        0.1000E+01             0.3780E+00           0.1827E+02           0.6147E-02             0.2116E+01
        0.1000E+01             0.4200E+00           0.0000E+00           0.3780E-01             0.2427E+02
        0.2000E+01             0.4820E-01           0.4672E+13           0.1168E-27             0.1291E-12
        0.2000E+01             0.9640E-01           0.1729E+10           0.6825E-20             0.1395E-08
        0.2000E+01             0.1446E+00           0.1700E+08           0.2384E-15             0.3194E-06
        0.2000E+01             0.1928E+00           0.6399E+06           0.3987E-12             0.1508E-04
        0.2000E+01             0.2410E+00           0.5026E+05           0.1262E-09             0.3000E-03
        0.2000E+01             0.2892E+00           0.6289E+04           0.1393E-07             0.3452E-02
        0.2000E+01             0.3374E+00           0.1065E+04           0.7431E-06             0.2724E-01
        0.2000E+01             0.3856E+00           0.2367E+03           0.2329E-04             0.1630E+00
        0.2000E+01             0.4338E+00           0.6182E+02           0.4864E-03             0.7902E+00
        0.2000E+01             0.4820E+00           0.0000E+00           0.7700E-02             0.9693E+01

                         NODE DEPTHS IN CM
    0.00       4.00       8.00      12.00      16.00      20.00      27.00      30.00      33.00      38.00      44.00      50.00
   60.00      70.00      80.00      90.00     100.00     110.00     120.00

               INITIAL WATER CONTENT AT THE NODES (CC/CC)
    0.25       0.25       0.25       0.25       0.25       0.25       0.25       0.25       0.37       0.37       0.37       0.37
    0.37       0.37       0.37       0.37       0.37       0.37       0.37

ROOT DENSITY (GM PER CC) AT GAUSS POINTS

  DEPTH      DENSITY
    0.85       3.91
    3.15       1.87
    4.85       1.09
    7.15       0.52
    8.85       0.30
   11.15       0.14
   12.85       0.08
   15.15       0.04
   16.85       0.02
   19.15       0.01
   21.48       0.01
   25.52       0.00
   27.63       0.00
   29.37       0.00
```

```
    30.63       0.00
    32.37       0.00
    34.06       0.00
    36.94       0.00
    39.27       0.00
    42.73       0.00
    45.27       0.00
    48.73       0.00
    52.11       0.00
    57.89       0.00
    62.11       0.00
    67.89       0.00
    72.11       0.00
    77.89       0.00
    82.11       0.00
    87.89       0.00
    92.11       0.00
    97.89       0.00
   102.11       0.00
   107.89       0.00
   112.11       0.00
   117.89       0.00
DAY          1     HOUR        8.00
WATER IN PROFILE      41.95  CM
WATER CONTENT AT THE NODES(CC/CC)
.2199E+000.2515E+000.2533E+000.2550E+000.2568E+000.2591E+000.2617E+000.2645E+000.3604E+000.3636E+000.3663E+000.3685E+00
.3703E+000.3714E+000.3722E+000.3726E+000.3728E+000.3729E+000.3729E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4741E-02   CM
DAY          1     HOUR       16.00
WATER IN PROFILE      41.35  CM
WATER CONTENT AT THE NODES(CC/CC)
.7471E-010.2192E+000.2449E+000.2468E+000.2549E+000.2589E+000.2620E+000.2646E+000.3603E+000.3628E+000.3651E+000.3670E+00
.3686E+000.3699E+000.3708E+000.3715E+000.3719E+000.3721E+000.3721E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9348E-02   CM
DAY          1     HOUR       24.00
WATER IN PROFILE      41.33  CM
WATER CONTENT AT THE NODES(CC/CC)
.2141E+000.2142E+000.2275E+000.2397E+000.2480E+000.2540E+000.2584E+000.2617E+000.3587E+000.3615E+000.3639E+000.3658E+00
.3674E+000.3687E+000.3697E+000.3704E+000.3709E+000.3711E+000.3711E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1366E-01   CM

STAGE          1    STAGE DAY          1    DAY NO.          1
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 LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1         30.00000         0.24073         90.71114
   2         90.00000         0.36634         93.50611

             DAILY VALUES (CM)                     CUMULATIVE VALUES (CM)

   PE       AE       TRANS   PRECIP   INFILT     PE       AE      TRANS   PRECIP   INFILT
 0.700    0.696     0.348    0.000    0.000    0.700    0.696    0.348    0.000    0.000

WATER IN PROFILE      41.33   CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1366E-01    CM

          DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
           0.8453E+00            0.2127E+00            0.1097E+04            0.3036E-06            0.1115E-01
           0.3155E+01            0.2127E+00            0.1095E+04            0.3052E-06            0.1118E-01
           0.4845E+01            0.2158E+00            0.9874E+03            0.3920E-06            0.1277E-01
           0.7155E+01            0.2243E+00            0.7516E+03            0.7589E-06            0.1811E-01
           0.8845E+01            0.2300E+00            0.6286E+03            0.1170E-05            0.2276E-01
           0.1115E+02            0.2371E+00            0.5057E+03            0.1981E-05            0.3008E-01
           0.1285E+02            0.2415E+00            0.4436E+03            0.2720E-05            0.3558E-01
           0.1515E+02            0.2464E+00            0.3845E+03            0.3846E-05            0.4273E-01
           0.1685E+02            0.2495E+00            0.3521E+03            0.4760E-05            0.4783E-01
           0.1915E+02            0.2530E+00            0.3190E+03            0.6046E-05            0.5428E-01
           0.2148E+02            0.2552E+00            0.2999E+03            0.7020E-05            0.5874E-01
           0.2552E+02            0.2577E+00            0.2795E+03            0.8323E-05            0.6428E-01
           0.2763E+02            0.2593E+00            0.2673E+03            0.9276E-05            0.6807E-01
           0.2937E+02            0.2612E+00            0.2537E+03            0.1052E-04            0.7277E-01
           0.3063E+02            0.2824E+00            0.1457E+03            0.1637E-01            0.1481E+00
           0.3237E+02            0.3383E+00            0.1051E+04            0.3242E-03            0.2828E-01
           0.3406E+02            0.3594E+00            0.5278E+03            0.3795E-05            0.6353E-01
           0.3694E+02            0.3610E+00            0.5014E+03            0.4263E-05            0.6749E-01
           0.3927E+02            0.3621E+00            0.4845E+03            0.4607E-05            0.7027E-01
           0.4273E+02            0.3635E+00            0.4644E+03            0.5070E-05            0.7385E-01
           0.4527E+02            0.3644E+00            0.4514E+03            0.5406E-05            0.7635E-01
           0.4873E+02            0.3655E+00            0.4358E+03            0.5853E-05            0.7957E-01
           0.5211E+02            0.3663E+00            0.4258E+03            0.6171E-05            0.8179E-01
           0.5789E+02            0.3672E+00            0.4137E+03            0.6587E-05            0.8460E-01
           0.6211E+02            0.3678E+00            0.4060E+03            0.6874E-05            0.8650E-01
           0.6789E+02            0.3685E+00            0.3968E+03            0.7238E-05            0.8885E-01
           0.7211E+02            0.3690E+00            0.3910E+03            0.7482E-05            0.9039E-01
           0.7789E+02            0.3696E+00            0.3843E+03            0.7782E-05            0.9225E-01
           0.8211E+02            0.3699E+00            0.3801E+03            0.7977E-05            0.9345E-01
           0.8789E+02            0.3703E+00            0.3754E+03            0.8207E-05            0.9484E-01
           0.9211E+02            0.3706E+00            0.3726E+03            0.8349E-05            0.9569E-01
           0.9789E+02            0.3708E+00            0.3695E+03            0.8504E-05            0.9661E-01
           0.1021E+03            0.3710E+00            0.3679E+03            0.8591E-05            0.9712E-01
           0.1079E+03            0.3711E+00            0.3664E+03            0.8670E-05            0.9758E-01
           0.1121E+03            0.3712E+00            0.3659E+03            0.8699E-05            0.97[illegible]E-01
           0.1179E+03            0.3712E+00            0.3659E+03            0.8699E-05            0.9775E-01

DAY          2       HOUR           8.00

WATER IN PROFILE      41.26   CM

WATER CONTENT AT THE NODES(CC/CC)

.1782E+000.2367E+000.2388E+000.2424E+000.2471E+000.2518E+000.2558E+000.2590E+000.3571E+000.3600E+000.3625E+000.3646E+00

.3662E+000.3676E+000.3686E+000.3693E+000.3698E+000.3700E+000.3700E+00
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FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4007E-02   CM

DAY          2     HOUR        16.00

WATER IN PROFILE      40.70   CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.2060E+000.2272E+000.2403E+000.2474E+000.2518E+000.2553E+000.2581E+000.3564E+000.3591E+000.3614E+000.3634E+00

.3651E+000.3665E+000.3675E+000.3683E+000.3687E+000.3690E+000.3690E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7730E-02   CM

DAY          2     HOUR        24.00

WATER IN PROFILE      40.67   CM

WATER CONTENT AT THE NODES(CC/CC)

.1943E+000.1944E+000.2161E+000.2324E+000.2418E+000.2481E+000.2527E+000.2561E+000.3553E+000.3581E+000.3605E+000.3625E+00

.3641E+000.3654E+000.3665E+000.3672E+000.3677E+000.3680E+000.3680E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1119E-01   CM


STAGE          1     STAGE DAY          2     DAY NO.          2

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1         30.00000         0.22918        79.49812
    2         90.00000         0.36303        90.36657

           DAILY VALUES (CM)                         CUMULATIVE VALUES (CM)

   PE       AE      TRANS  PRECIP  INFILT      PE       AE      TRANS  PRECIP  INFILT
 0.700    0.653    0.348    0.000    0.000    1.400    1.349    0.696    0.000    0.000

WATER IN PROFILE      40.67   CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1119E-01   CM

        DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00              0.1829E+00         0.3216E+04           0.2247E-07            0.2813E-02
         0.3155E+01              0.1829E+00         0.3213E+04           0.2252E-07            0.2816E-02
         0.4845E+01              0.1900E+00         0.2450E+04           0.4341E-07            0.3986E-02
         0.7155E+01              0.2093E+00         0.1227E+04           0.2315E-06            0.9662E-02
         0.8845E+01              0.2198E+00         0.8664E+03           0.5378E-06            0.1509E-01
         0.1115E+02              0.2291E+00         0.6452E+03           0.1098E-05            0.2201E-01
         0.1285E+02              0.2345E+00         0.5467E+03           0.1641E-05            0.2722E-01
         0.1515E+02              0.2400E+00         0.4643E+03           0.2436E-05            0.3356E-01
         0.1685E+02              0.2433E+00         0.4208E+03           0.3090E-05            0.3806E-01
         0.1915E+02              0.2470E+00         0.3784E+03           0.3999E-05            0.4362E-01
         0.2148E+02              0.2493E+00         0.3542E+03           0.4691E-05            0.4746E-01
         0.2552E+02              0.2519E+00         0.3288E+03           0.5616E-05            0.5220E-01
         0.2763E+02              0.2536E+00         0.3136E+03           0.6297E-05            0.5546E-01
         0.2937E+02              0.2555E+00         0.2969E+03           0.7194E-05            0.5951E-01
         0.3063E+02              0.2772E+00         0.1662E+03           0.1418E-01            0.1251E+00
         0.3237E+02              0.3345E+00         0.1198E+04           0.2874E-03            0.2424E-01
         0.3406E+02              0.3560E+00         0.5881E+03           0.2971E-05            0.5595E-01
         0.3694E+02              0.3576E+00         0.5587E+03           0.3337E-05            0.5943E-01
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            0.3927E+02             0.3587E+00             0.5398E+03             0.3608E-05             0.6189E-01
            0.4273E+02             0.3601E+00             0.5171E+03             0.3975E-05             0.6508E-01
            0.4527E+02             0.3610E+00             0.5024E+03             0.4243E-05             0.6733E-01
            0.4873E+02             0.3621E+00             0.4846E+03             0.4604E-05             0.7024E-01
            0.5211E+02             0.3629E+00             0.4731E+03             0.4862E-05             0.7226E-01
            0.5789E+02             0.3638E+00             0.4591E+03             0.5203E-05             0.7485E-01
            0.6211E+02             0.3645E+00             0.4502E+03             0.5440E-05             0.7660E-01
            0.6789E+02             0.3652E+00             0.4395E+03             0.5743E-05             0.7879E-01
            0.7211E+02             0.3657E+00             0.4328E+03             0.5948E-05             0.8024E-01
            0.7789E+02             0.3663E+00             0.4249E+03             0.6201E-05             0.8199E-01
            0.8211E+02             0.3667E+00             0.4200E+03             0.6367E-05             0.8312E-01
            0.8789E+02             0.3671E+00             0.4144E+03             0.6563E-05             0.8444E-01
            0.9211E+02             0.3674E+00             0.4110E+03             0.6685E-05             0.8525E-01
            0.9789E+02             0.3677E+00             0.4074E+03             0.6819E-05             0.8614E-01
            0.1021E+03             0.3678E+00             0.4055E+03             0.6893E-05             0.8662E-01
            0.1079E+03             0.3680E+00             0.4037E+03             0.6961E-05             0.8707E-01
            0.1121E+03             0.3680E+00             0.4031E+03             0.6986E-05             0.8723E-01
            0.1179E+03             0.3680E+00             0.4031E+03             0.6986E-05             0.8723E-01
DAY          3     HOUR        8.00

WATER IN PROFILE      40.60   CM

WATER CONTENT AT THE NODES(CC/CC)

.1448E+000,.2107E+000,.2255E+000,.2332E+000,.2395E+000,.2456E+000,.2502E+000,.2538E+000,.3540E+000,.3569E+000,.3594E+000,.3614E+00

.3631E+000,.3645E+000,.3655E+000,.3662E+000,.3667E+000,.3670E+000,.3670E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3224E-02    CM

DAY          3     HOUR       16.00

WATER IN PROFILE      40.16   CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010,.1923E+000,.2139E+000,.2310E+000,.2397E+000,.2452E+000,.2492E+000,.2525E+000,.3532E+000,.3559E+000,.3583E+000,.3604E+00

.3621E+000,.3635E+000,.3645E+000,.3653E+000,.3656E+000,.3660E+000,.3660E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6236E-02    CM

DAY          3     HOUR       24.00

WATER IN PROFILE      40.14   CM

WATER CONTENT AT THE NODES(CC/CC)

.1659E+000,.1659E+000,.2088E+000,.2260E+000,.2358E+000,.2424E+000,.2472E+000,.2508E+000,.3522E+000,.3551E+000,.3575E+000,.3595E+00

.3612E+000,.3625E+000,.3636E+000,.3643E+000,.3648E+000,.3651E+000,.3651E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9054E-02    CM


STAGE          1     STAGE DAY          3     DAY NO.          3

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000         0.22067         71.23657
    2        90.00000         0.36006         87.53796
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             DAILY VALUES (CM)                          CUMULATIVE VALUES (CM)

   PE       AE      TRANS  PRECIP  INFILT     PE        AE     TRANS  PRECIP  INFILT
  0.700    0.531    0.318   0.000   0.000    2.100     1.880   1.044   0.000   0.000

WATER IN PROFILE     40.14  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9054E-02   CM

        DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00           0.1648E+00           0.6747E+04           0.3735E-08           0.1089E-02
         0.3155E+01           0.1648E+00           0.6744E+04           0.3739E-08           0.1089E-02
         0.4845E+01           0.1741E+00           0.4555E+04           0.9672E-08           0.1801E-02
         0.7155E+01           0.1996E+00           0.1721E+04           0.1021E-06           0.6265E-02
         0.8845E+01           0.2126E+00           0.1100E+04           0.3015E-06           0.1111E-01
         0.1115E+02           0.2224E+00           0.7969E+03           0.6586E-06           0.1680E-01
         0.1285E+02           0.2281E+00           0.6656E+03           0.1019E-05           0.2116E-01
         0.1515E+02           0.2338E+00           0.5582E+03           0.1560E-05           0.2651E-01
         0.1685E+02           0.2373E+00           0.5022E+03           0.2014E-05           0.3035E-01
         0.1915E+02           0.2412E+00           0.4480E+03           0.2656E-05           0.3513E-01
         0.2148E+02           0.2436E+00           0.4173E+03           0.3154E-05           0.3847E-01
         0.2552E+02           0.2463E+00           0.3852E+03           0.3828E-05           0.4262E-01
         0.2763E+02           0.2481E+00           0.3660E+03           0.4332E-05           0.4550E-01
         0.2937E+02           0.2502E+00           0.3449E+03           0.5005E-05           0.4911E-01
         0.3063E+02           0.2724E+00           0.1884E+03           0.1237E-01           0.1066E+00
         0.3237E+02           0.3309E+00           0.1354E+04           0.2570E-03           0.2099E-01
         0.3406E+02           0.3529E+00           0.6499E+03           0.2369E-05           0.4975E-01
         0.3694E+02           0.3545E+00           0.6167E+03           0.2669E-05           0.5292E-01
         0.3927E+02           0.3556E+00           0.5952E+03           0.2891E-05           0.5516E-01
         0.4273E+02           0.3570E+00           0.5695E+03           0.3195E-05           0.5810E-01
         0.4527E+02           0.3580E+00           0.5528E+03           0.3417E-05           0.6017E-01
         0.4873E+02           0.3591E+00           0.5327E+03           0.3718E-05           0.6286E-01
         0.5211E+02           0.3599E+00           0.5196E+03           0.3933E-05           0.6473E-01
         0.5789E+02           0.3609E+00           0.5038E+03           0.4218E-05           0.6712E-01
         0.6211E+02           0.3615E+00           0.4936E+03           0.4416E-05           0.6874E-01
         0.6789E+02           0.3623E+00           0.4817E+03           0.4669E-05           0.7075E-01
         0.7211E+02           0.3628E+00           0.4741E+03           0.4840E-05           0.7209E-01
         0.7789E+02           0.3634E+00           0.4652E+03           0.5050E-05           0.7370E-01
         0.8211E+02           0.3638E+00           0.4597E+03           0.5188E-05           0.7474E-01
         0.8789E+02           0.3642E+00           0.4534E+03           0.5352E-05           0.7595E-01
         0.9211E+02           0.3645E+00           0.4497E+03           0.5453E-05           0.7670E-01
         0.9789E+02           0.3648E+00           0.4457E+03           0.5564E-05           0.7751E-01
         0.1021E+03           0.3649E+00           0.4435E+03           0.5626E-05           0.7795E-01
         0.1079E+03           0.3651E+00           0.4416E+03           0.5683E-05           0.7836E-01
         0.1121E+03           0.3651E+00           0.4409E+03           0.5703E-05           0.7851E-01
         0.1179E+03           0.3651E+00           0.4409E+03           0.5703E-05           0.7851E-01
DAY          4      HOUR        8.00

WATER IN PROFILE     40.08  CM

WATER CONTENT AT THE NODES(CC/CC)

.5835E-010.2134E+000.2268E+000.2255E+000.2341E+000.2405E+000.2453E+000.2491E+000.3512E+000.3541E+000.3565E+000.3586E+00

.3603E+000.3616E+000.3627E+000.3634E+000.3639E+000.3642E+000.3642E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2641E-02   CM

DAY          4      HOUR       16.00
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WATER IN PROFILE      39.70  CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1787E+000.2029E+000.2238E+000.2337E+000.2399E+000.2443E+000.2478E+000.3504E+000.3532E+000.3556E+000.3577E+00

.3594E+000.3608E+000.3618E+000.3626E+000.3631E+000.3633E+000.3633E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.5121E-02    CM

DAY           4      HOUR        24.00

WATER IN PROFILE      39.68  CM

WATER CONTENT AT THE NODES(CC/CC)

.1503E+000.1503E+000.2027E+000.2205E+000.2308E+000.2377E+000.2427E+000.2465E+000.3496E+000.3525E+000.3548E+000.3569E+00

.3586E+000.3599E+000.3610E+000.3617E+000.3622E+000.3625E+000.3625E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7454E-02    CM


STAGE          1     STAGE DAY          4     DAY NO.          4

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1        30.00000         0.21349          64.26706
   2        90.00000         0.35740          85.01205
             DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)

   PE        AE      TRANS  PRECIP  INFILT     PE       AE     TRANS  PRECIP  INFILT
  0.700    0.461    0.348   0.000   0.000    2.800    2.341    1.392   0.000   0.000

WATER IN PROFILE      39.68  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7454E-02    CM

         DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
          0.8453E+00           0.1495E+00           0.1352E+05           0.6936E-09           0.4469E-03
          0.3155E+01           0.1495E+00           0.1352E+05           0.6940E-09           0.4470E-03
          0.4845E+01           0.1607E+00           0.8065E+04           0.2425E-08           0.8664E-03
          0.7155E+01           0.1914E+00           0.2321E+04           0.4950E-07           0.4273E-02
          0.8845E+01           0.2064E+00           0.1355E+04           0.1820E-06           0.8507E-02
          0.1115E+02           0.2167E+00           0.9584E+03           0.4213E-06           0.1326E-01
          0.1285E+02           0.2227E+00           0.7902E+03           0.6722E-06           0.1698E-01
          0.1515E+02           0.2287E+00           0.6545E+03           0.1061E-05           0.2162E-01
          0.1685E+02           0.2323E+00           0.5846E+03           0.1394E-05           0.2498E-01
          0.1915E+02           0.2363E+00           0.5176E+03           0.1673E-05           0.2920E-01
          0.2148E+02           0.2399E+00           0.4799E+03           0.2248E-05           0.3216E-01
          0.2552E+02           0.2417E+00           0.4408E+03           0.2763E-05           0.3587E-01
          0.2763E+02           0.2436E+00           0.4175E+03           0.3151E-05           0.3845E-01
          0.2937E+02           0.2458E+00           0.3918E+03           0.3675E-05           0.4171E-01
          0.3063E+02           0.2684E+00           0.2095E+03           0.1100E-01           0.9302E-01
          0.3237E+02           0.3279E+00           0.1503E+04           0.2337E-03           0.1858E-01
          0.3406E+02           0.3503E+00           0.7077E+03           0.1954E-05           0.4501E-01
          0.3694E+02           0.3519E+00           0.6713E+03           0.2202E-05           0.4789E-01
          0.3927E+02           0.3530E+00           0.6478E+03           0.2367E-05           0.4994E-01
          0.4273E+02           0.3544E+00           0.6197E+03           0.2640E-05           0.5262E-01
          0.4527E+02           0.3553E+00           0.6014E+03           0.2825E-05           0.5450E-01
          0.4873E+02          0.3565E+00          0.5792E+03          0.3075E-05          0.5696E-01
          0.5211E+02          0.3573E+00          0.5649E+03          0.3255E-05          0.5867E-01
          0.5789E+02          0.3583E+00          0.5476E+03          0.3493E-05          0.6085E-01
          0.6211E+02          0.3589E+00          0.5365E+03          0.3658E-05          0.6233E-01
          0.6789E+02          0.3597E+00          0.5233E+03          0.3869E-05          0.6418E-01
          0.7211E+02          0.3602E+00          0.5150E+03          0.4012E-05          0.6540E-01
          0.7789E+02          0.3608E+00          0.5053E+03          0.4188E-05          0.6687E-01
          0.8211E+02          0.3612E+00          0.4993E+03          0.4304E-05          0.6782E-01
          0.8789E+02          0.3616E+00          0.4924E+03          0.4440E-05          0.6893E-01
          0.9211E+02          0.3619E+00          0.4883E+03          0.4525E-05          0.6961E-01
          0.9789E+02          0.3622E+00          0.4840E+03          0.4618E-05          0.7035E-01
          0.1021E+03          0.3623E+00          0.4816E+03          0.4670E-05          0.7076E-01
          0.1079E+03          0.3625E+00          0.4795E+03          0.4717E-05          0.7113E-01
          0.1121E+03          0.3625E+00          0.4787E+03          0.4734E-05          0.7127E-01
          0.1179E+03          0.3625E+00          0.4787E+03          0.4734E-05          0.7127E-01
DAY            5      HOUR         8.00

WATER IN PROFILE      39.63  CM

WATER CONTENT AT THE NODES(CC/CC)

.4350E-010.2058E+000.2131E+000.2206E+000.2297E+000.2362E+000.2412E+000.2450E+000.3488E+000.3516E+000.3540E+000.3561E+00

.3578E+000.3591E+000.3601E+000.3609E+000.3614E+000.3616E+000.3616E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2199E-02   CM

DAY            5      HOUR        16.00

WATER IN PROFILE      39.28  CM

WATER CONTENT AT THE NODES(CC/CC)

.4031E-010.1652E+000.1932E+000.2182E+000.2287E+000.2353E+000.2401E+000.2439E+000.3481E+000.3509E+000.3532E+000.3553E+00

.3570E+000.3583E+000.3594E+000.3601E+000.3606E+000.3608E+000.3608E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4275E-02   CM

DAY            5      HOUR        24.00

WATER IN PROFILE      39.27  CM

WATER CONTENT AT THE NODES(CC/CC)

.1368E+000.1368E+000.1971E+000.2157E+000.2264E+000.2336E+000.2388E+000.2427E+000.3474E+000.3501E+000.3525E+000.3545E+00

.3562E+000.3576E+000.3586E+000.3593E+000.3598E+000.3601E+000.3601E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6238E-02   CM

STAGE           1    STAGE DAY           5    DAY NO.          5

 LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1        30.00000         0.20723         58.18646
   2        90.00000         0.35501         82.74266

            DAILY VALUES (CM)                  CUMULATIVE VALUES (CM)
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  PF      AF       TRANS  PRECIP  INFILT     PE       AF      TRANS  PRECIP  INFILT
 0.700   0.409    0.348   0.000   0.000     3.500    2.750    1.740   0.000   0.000

WATER IN PROFILE      39.27   CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6238E-02    CM

         DEPTH(CM)          WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
          0.8453E+00              0.1361E+00             0.2629E+05           0.1386E-09           0.1907E-03
          0.3155E+01              0.1361E+00             0.2629E+05           0.1387E-09           0.1907E-03
          0.4845E+01              0.1490E+00             0.1383E+05           0.6569E-09           0.4342E-03
          0.7155E+01              0.1841E+00             0.3066E+04           0.2523E-07           0.2991E-02
          0.8845E+01              0.2009E+00             0.1646E+04           0.1137E-06           0.6634E-02
          0.1115E+02              0.2117E+00             0.1134E+04           0.2805E-06           0.1069E-01
          0.1285E+02              0.2179E+00             0.9217E+03           0.4630E-06           0.1394E-01
          0.1515E+02              0.2242E+00             0.7534E+03           0.7543E-06           0.1805E-01
          0.1685E+02              0.2280E+00             0.6682E+03           0.1009E-05           0.2105E-01
          0.1915E+02              0.2322E+00             0.5874E+03           0.1378E-05           0.2483E-01
          0.2148E+02              0.2348E+00             0.5424E+03           0.1671E-05           0.2749E-01
          0.2552E+02              0.2378E+00             0.4960E+03           0.2076E-05           0.3084E-01
          0.2763E+02              0.2397E+00             0.4685E+03           0.2384E-05           0.3317E-01
          0.2937E+02              0.2419E+00             0.4382E+03           0.2802E-05           0.3613E-01
          0.3063E+02              0.2649E+00             0.2299E+03           0.9926E-02           0.8256E-01
          0.3237E+02              0.3253E+00             0.1646E+04           0.2151E-03           0.1669E-01
          0.3406E+02              0.3480E+00             0.7626E+03           0.1650E-05           0.4123E-01
          0.3694E+02              0.3496E+00             0.7235E+03           0.1859E-05           0.4385E-01
          0.3927E+02              0.3507E+00             0.6983E+03           0.2014E-05           0.4572E-01
          0.4273E+02              0.3521E+00             0.6680E+03           0.2227E-05           0.4817E-01
          0.4527E+02              0.3530E+00             0.6483E+03           0.2383E-05           0.4989E-01
          0.4873E+02              0.3541E+00             0.6245E+03           0.2594E-05           0.5214E-01
          0.5211E+02              0.3549E+00             0.6090E+03           0.2745E-05           0.5370E-01
          0.5789E+02              0.3559E+00             0.5903E+03           0.2946E-05           0.5570E-01
          0.6211E+02              0.3565E+00             0.5784E+03           0.3085E-05           0.5706E-01
          0.6789E+02              0.3573E+00             0.5642E+03           0.3263E-05           0.5874E-01
          0.7211E+02              0.3578E+00             0.5553E+03           0.3384E-05           0.5986E-01
          0.7789E+02              0.3584E+00             0.5448E+03           0.3532E-05           0.6121E-01
          0.8211E+02              0.3588E+00             0.5383E+03           0.3630E-05           0.6208E-01
          0.8789E+02              0.3592E+00             0.5309E+03           0.3745E-05           0.6310E-01
          0.9211E+02              0.3595E+00             0.5265E+03           0.3816E-05           0.6372E-01
          0.9789E+02              0.3598E+00             0.5218E+03           0.3894E-05           0.6439E-01
          0.1021E+03              0.3599E+00             0.5193E+03           0.3938E-05           0.6477E-01
          0.1079E+03              0.3601E+00             0.5170E+03           0.3978E-05           0.6511E-01
          0.1121E+03              0.3601E+00             0.5161E+03           0.3992E-05           0.6523E-01
          0.1179E+03              0.3601E+00             0.5161E+03           0.3992E-05           0.6523E-01
DAY            6      HOUR           8.00

WATER I  PROFILE      39.23   CM

WATER CONTENT AT THE NODES(CC/CC)

.4256E-010,.1880E+000,.2034E+000,.2167E+000,.2258E+000,.2324E+000,.2375E+000,.2414E+000,.3488E+000,.3494E+000,.3518E+000,.3538E+00

.3555E+000,.3568E+000,.3576E+000,.3586E+000,.3591E+000,.3593E+000,.3593E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1859E-02    CM

DAY            6      HOUR          16.00

WATER I  PROFILE      38.91   CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1552E+000.1827E+000.2116E+000.2243E+000.2316E+000.2366E+000.2405E+000.3460E+000.3487E+000.3511E+000.3531E+00
.3548E+000.3561E+000.3571E+000.3579E+000.3584E+000.3586E+000.3586E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3623E-02   CM
DAY          6      HOUR        24.00
WATER IN PROFILE      38.90   CM
WATER CONTENT AT THE NODES(CC/CC)
.1252E+000.1253E+000.1903E+000.2106E+000.2223E+000.2299E+000.2353E+000.2394E+000.3454E+000.3481E+000.3504E+000.3524E+00
.3541E+000.3554E+000.3564E+000.3572E+000.3577E+000.3579E+000.3579E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.5299E-02   CM

STAGE          1     STAGE DAY          6     DAY NO.          6
  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1         30.00000         0.20136          52.48890
   2         90.00000         0.35286          80.69552
               DAILY VALUES (CM)                      CUMULATIVE VALUES (CM)
   PE      AE      TRANS  PRECIP  INFILT     PE      AE     TRANS  PRECIP  INFILT
  0.700   0.375   0.348   0.000   0.000    4.200   3.125   2.088   0.000   0.000
WATER IN PROFILE      38.90   CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.5299E-02   CM
       DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00          0.1248E+00          0.4872E+05          0.3113E-10          0.8652E-04
        0.3155E+01          0.1248E+00          0.4872E+05          0.3114E-10          0.8653E-04
        0.4845E+01          0.1386E+00          0.2318E+05          0.1881E-09          0.2241E-03
        0.7155E+01          0.1761E+00          0.4211E+04          0.1169E-07          0.1991E-02
        0.8845E+01          0.1942E+00          0.2097E+04          0.6324E-07          0.4864E-02
        0.1115E+02          0.2061E+00          0.1370E+04          0.1775E-06          0.8395E-02
        0.1285E+02          0.2130E+00          0.1084E+04          0.3126E-06          0.1133E-01
        0.1515E+02          0.2198E+00          0.8662E+03          0.5381E-06          0.1510E-01
        0.1685E+02          0.2240E+00          0.7591E+03          0.7408E-06          0.1788E-01
        0.1915E+02          0.2284E+00          0.6604E+03          0.1038E-05          0.2137E-01
        0.2148E+02          0.2311E+00          0.6064E+03          0.1276E-05          0.2384E-01
        0.2552E+02          0.2342E+00          0.5514E+03          0.1607E-05          0.2692E-01
        0.2763E+02          0.2362E+00          0.5191E+03          0.1859E-05          0.2909E-01
        0.2937E+02          0.2386E+00          0.3840E+03          0.2202E-05          0.3181E-01
        0.3063E+02          0.2618E+00          0.2496E+03          0.9060E-02          0.7430E-01
        0.3237E+02          0.3230E+00          0.1783E+04          0.1999E-03          0.1519E-01
        0.3406E+02          0.3460E+00          0.8145E+03          0.1422E-05          0.3815E-01
        0.3694E+02          0.3476E+00          0.7732E+03          0.1599E-05          0.4056E-01
        0.3927E+02          0.3486E+00          0.7466E+03          0.1732E-05          0.4227E-01
        0.4273E+02          0.3500E+00          0.7145E+03          0.1913E-05          0.4451E-01
        0.4527E+02          0.3509E+00          0.6936E+03          0.2045E-05          0.4609E-01
        0.4873E+02          0.3521E+00          0.6683E+03          0.2225E-05          0.4815E-01
        0.5211E+02          0.3528E+00          0.6519E+03          0.2354E-05          0.4958E-01
        0.5789E+02          0.3538E+00          0.6320E+03          0.2524E-05          0.5141E-01
        0.6211E+02          0.3544E+00          0.6193E+03          0.2643E-05          0.5265E-01
        0.6789E+02          0.3552E+00          0.6043E+03          0.2794E-05          0.5420E-01
        0.7211E+02          0.3557E+00          0.5947E+03          0.2897E-05          0.5522E-01
        0.7789E+02          0.3563E+00          0.5836E+03          0.3023E-05          0.5646E-01
        0.8211E+02          0.3566E+00          0.5767E+03          0.3106E-05          0.5726E-01
        0.8789E+02          0.3571E+00          0.5688E+03          0.3204E-05          0.5819E-01
        0.9211E+02          0.3573E+00          0.5641E+03          0.3265E-05          0.5876E-01
        0.9789E+02          0.3576E+00          0.5591E+03          0.3331E-05          0.5938E-01
        0.1021E+03          0.3578E+00          0.5564E+03          0.3369E-05          0.5972E-01
        0.1079E+03          0.3579E+00          0.5539E+03          0.3402E-05          0.6003E-01
        0.1121E+03          0.3579E+00          0.5530E+03          0.3415E-05          0.6015E-01
        0.1179E+03          0.3579E+00          0.5530E+03          0.3415E-05          0.6015E-01
DAY          7     HOUR        8.00

WATER IN PROFILE      38.85  CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010.1644E+000.1947E+000.2111E+000.2218E+000.2289E+000.2342E+000.2382E+000.3447E+000.3474E+000.3498E+000.3518E+00

.3534E+000.3547E+000.3558E+000.3565E+000.3570E+000.3572E+000.3572E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1594E-02   CM

DAY          7     HOUR       16.00

WATER IN PROFILE      38.54  CM

WATER CONTENT AT THE NODES(CC/CC)

.4048E-010.1617E+000.1645E+000.1967E+000.2176E+000.2274E+000.2332E+000.2373E+000.3441E+000.3468E+000.3491E+000.3511E+00

.3528E+000.3541E+000.3551E+000.3558E+000.3563E+000.3566E+000.3566E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.3113E-02   CM

DAY          7     HOUR       24.00

WATER IN PROFILE      38.54  CM

WATER CONTENT AT THE NODES(CC/CC)

.1269E+000.1269E+000.1728E+000.2018E+000.2164E+000.2254E+000.2315E+000.2360E+000.3434E+000.3462E+000.3485E+000.3505E+00

.3521E+000.3535E+000.3545E+000.3552E+000.3557E+000.3559E+000.3559E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.4562E-02   CM

STAGE          1    STAGE DAY          7    DAY NO.         7

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1          30.00000          0.19557          46.87182
   2          90.00000          0.35091          78.84559

            DAILY VALUES (CM)                         CUMULATIVE VALUES (CM)

   PE       AE      TRANS   PRECIP   INFILT     PE       AE      TRANS   PRECIP   INFILT
  0.700    0.353    0.342    0.000    0.000    4.900    3.478    2.430    0.000    0.000
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WATER IN PROFILE      38.54  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4562E-02   CM
      DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
       0.8453E+00           0.1265E+00          0.4439E+05        0.3902E-10          0.9750E-04
       0.3155E+01           0.1265E+00          0.4438E+05        0.3902E-10          0.9751E-04
       0.4845E+01           0.1359E+00          0.2664E+05        0.1343E-09          0.1875E-03
       0.7155E+01           0.1615E+00          0.7770E+04        0.2653E-08          0.9087E-03
       0.8845E+01           0.1774E+00          0.3990E+04        0.1333E-07          0.2134E-02
       0.1115E+02           0.1950E+00          0.2032E+04        0.6829E-07          0.5065E-02
       0.1285E+02           0.2046E+00          0.1443E+04        0.1565E-06          0.7854E-02
       0.1515E+02           0.2133E+00          0.1076E+04        0.3185E-06          0.1144E-01
       0.1685E+02           0.2183E+00          0.9099E+03        0.4776E-06          0.1417E-01
       0.1915E+02           0.2236E+00          0.7683E+03        0.7194E-06          0.1760E-01
       0.2148E+02           0.2268E+00          0.6938E+03        0.9210E-06          0.2006E-01
       0.2552E+02           0.2304E+00          0.6209E+03        0.1205E-05          0.2313E-01
       0.2763E+02           0.2326E+00          0.5794E+03        0.1425E-05          0.2527E-01
       0.2937E+02           0.2352E+00          0.5356E+03        0.1724E-05          0.2794E-01
       0.3063E+02           0.2588E+00          0.2709E+03        0.8267E-02          0.6690E-01
       0.3237E+02           0.3208E+00          0.1929E+04        0.1862E-03          0.1385E-01
       0.3406E+02           0.3441E+00          0.8680E+03        0.1231E-05          0.3540E-01
       0.3694E+02           0.3457E+00          0.8231E+03        0.1388E-05          0.3769E-01
       0.3927E+02           0.3468E+00          0.7943E+03        0.1505E-05          0.3930E-01
       0.4273E+02           0.3481E+00          0.7599E+03        0.1664E-05          0.4140E-01
       0.4527E+02           0.3490E+00          0.7375E+03        0.1780E-05          0.4288E-01
       0.4873E+02           0.3502E+00          0.7106E+03        0.1936E-05          0.4479E-01
       0.5211E+02           0.3509E+00          0.6931E+03        0.2048E-05          0.4612E-01
       0.5789E+02           0.3519E+00          0.6721E+03        0.2196E-05          0.4782E-01
       0.6211E+02           0.3525E+00          0.6587E+03        0.2299E-05          0.4897E-01
       0.6789E+02           0.3533E+00          0.6427E+03        0.2430E-05          0.5041E-01
       0.7211E+02           0.3537E+00          0.6326E+03        0.2519E-05          0.5135E-01
       0.7789E+02           0.3543E+00          0.6209E+03        0.2628E-05          0.5250E-01
       0.8211E+02           0.3547E+00          0.6135E+03        0.2700E-05          0.5323E-01
       0.8789E+02           0.3551E+00          0.6052E+03        0.2784E-05          0.5409E-01
       0.9211E+02           0.3554E+00          0.6003E+03        0.2837E-05          0.5462E-01
       0.9789E+02           0.3557E+00          0.5949E+03        0.2894E-05          0.5520E-01
       0.1021E+03           0.3558E+00          0.5921E+03        0.2926E-05          0.5551E-01
       0.1079E+03           0.3559E+00          0.5895E+03        0.2956E-05          0.5580E-01
       0.1121E+03           0.3560E+00          0.5885E+03        0.2966E-05          0.5591E-01
       0.1179E+03           0.3560E+00          0.5885E+03        0.2966E-05          0.5591E-01
DAY        8     HOUR        8.00
WATER IN PROFILE      38.50  CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010.1632E+000.1813E+000.2006E+000.2165E+000.2245E+000.2304E+000.2348E+000.3427E+000.3455E+000.3479E+000.3499E+00
.3515E+000.3528E+000.3538E+000.3546E+000.3551E+000.3553E+000.3553E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1384E-02   CM
DAY        8     HOUR       16.00
WATER IN PROFILE      38.19  CM
WATER CONTENT AT THE NODES(CC/CC)
.4023E-010.1622E+000.1653E+000.1814E+000.2048E+000.2207E+000.2286E+000.2338E+000.3421E+000.3449E+000.3472E+000.3492E+00
.3509E+000.3522E+000.3532E+000.3540E+000.3544E+000.3547E+000.3547E+00
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FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2707E-02   CM

DAY          8     HOUR        24.00

WATER IN PROFILE      38.19  CM

WATER CONTENT AT THE NODES(CC/CC)

.1281E+000.1281E+000.1624E+000.1910E+000.2083E+000.2193E+000.2268E+000.2320E+000.3411E+000.3441E+000.3465E+000.3486E+00

.3503E+000.3516E+000.3526E+000.3534E+000.3538E+000.3541E+000.3541E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3974E-02   CM


STAGE          1    STAGE DAY          8    DAY NO.          8

  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000         0.18981          41.27493
    2        90.00000         0.34899          77.01537

            DAILY VALUES (CM)                      CUMULATIVE VALUES (CM)

   PE      AE      TRANS  PRECIP  INFILT     PE       AE     TRANS  PRECIP  INFILT
  0.700   0.353   0.342   0.000   0.000     5.600    3.831   2.772   0.000   0.000

WATER IN PROFILE      38.19  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3974E-02   CM

       DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00             0.1276E+00           0.4167E+05          0.4548E-10            0.1057E-03
        0.3155E+01             0.1276E+00           0.4166E+05          0.4549E-10            0.1057E-03
        0.4845E+01             0.1348E+00           0.2821E+05          0.1170E-09            0.1743E-03
        0.7155E+01             0.1544E+00           0.1072E+05          0.1219E-08            0.6021E-03
        0.8845E+01             0.1676E+00           0.5972E+04          0.5019E-08            0.1273E-02
        0.1115E+02             0.1841E+00           0.3064E+04          0.2526E-07            0.2993E-02
        0.1285E+02             0.1939E+00           0.2117E+04          0.6184E-07            0.4806E-02
        0.1515E+02             0.2043E+00           0.1462E+04          0.1515E-06            0.7721E-02
        0.1685E+02             0.2104E+00           0.1182E+04          0.2533E-06            0.1013E-01
        0.1915E+02             0.2170E+00           0.9511E+03          0.4291E-06            0.1339E-01
        0.2148E+02             0.2210E+00           0.8355E+03          0.5873E-06            0.1581E-01
        0.2552E+02             0.2253E+00           0.7270E+03          0.8226E-06            0.1890E-01
        0.2763E+02             0.2280E+00           0.6677E+03          0.1011E-05            0.2167E-01
        0.2937E+02             0.2311E+00           0.6078E+03          0.1269E-05            0.2377E-01
        0.3063E+02             0.2552E+00           0.2995E+03          0.7382E-07            0.5884E-01
        0.3237E+02             0.3182E+00           0.2119E+04          0.1712E-03            0.1240E-01
        0.3406E+02             0.3418E+00           0.9352E+03          0.1040E-05            0.3211E-01
        0.3691E+02             0.3435E+00           0.8831E+03          0.1184E-05            0.3470E-01
        0.3927E+02             0.3447E+00           0.8501E+03          0.1291E-05            0.3629E-01
        0.4273E+02             0.3461E+00           0.8111E+03          0.1435E-05            0.3834E-01
        0.4527E+02             0.3471E+00           0.7961E+03          0.1541E-05            0.3978E-01
        0.4873E+02             0.3483E+00           0.7563E+03          0.1682E-05            0.4163E-01
        0.5211E+02             0.3490E+00           0.7371E+03          0.1780E-05            0.4291E-01
        0.5789E+02             0.3500E+00           0.7142E+03          0.1914E-05            0.4453E-01
        0.6211E+02             0.3506E+00           0.6996E+03          0.2046E-05            0.4563E-01
        0.6789E+02             0.3511E+00           0.6823E+03          0.2122E-05            0.4698E-01
        0.7211E+02             0.3519E+00           0.6715E+03          0.2201E-05            0.4788E-01
        0.7789E+02             0.3525E+00           0.6589E+03          0.2298E-05            0.4896E-01
        0.8211E+02          0.3529E+00          0.6510E+03          0.2361E-05          0.4965E-01
        0.8789E+02          0.3533E+00          0.6421E+03          0.2435E-05          0.5046E-01
        0.9211E+02          0.3535E+00          0.6368E+03          0.2481E-05          0.5095E-01
        0.9789E+02          0.3538E+00          0.6311E+03          0.2532E-05          0.5149E-01
        0.1021E+03          0.3540E+00          0.6281E+03          0.2560E-05          0.5179E-01
        0.1079E+03          0.3541E+00          0.6253E+03          0.2586E-05          0.5206E-01
        0.1121E+03          0.3542E+00          0.6243E+03          0.2596E-05          0.5216E-01
        0.1179E+03          0.3542E+00          0.6243E+03          0.2596E-05          0.5216E-01
DAY          9     HOUR        8.00

WATER IN PROFILE     38.14  CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010.1632E+000.1711E+000.1909E+000.2081E+000.2191E+000.2259E+000.2309E+000.3404E+000.3434E+000.3458E+000.3479E+00

.3497E+000.3510E+000.3520E+000.3528E+000.3533E+000.3535E+000.3535E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1213E-02   CM

DAY          9     HOUR       16.00

WATER IN PROFILE     37.84  CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1607E+000.1629E+000.1789E+000.1948E+000.2106E+000.2217E+000.2285E+000.3392E+000.3425E+000.3452E+000.3473E+00

.3490E+000.3504E+000.3514E+000.3522E+000.3527E+000.3529E+000.3529E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2376E-02   CM

DAY          9     HOUR       24.00

WATER IN PROFILE     37.84  CM

WATER CONTENT AT THE NODES(CC/CC)

.1265E+000.1265E+000.1586E+000.1829E+000.2002E+000.2122E+000.2209E+000.2271E+000.3382E+000.3416E+000.3443E+000.3466E+00

.3484E+000.3498E+000.3509E+000.3516E+000.3521E+000.3524E+000.3524E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3491E-02   CM


STAGE         1    STAGE DAY         9    DAY NO.         9

  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
   1         30.00000        0.18432          35.94328
   2         90.00000        0.34701          75.13580
             DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)

  PE     AE     TRANS  PRECIP  INFILT     PE      AE     TRANS  PRECIP  INFILT
 0.700  0.350   0.340   0.000   0.000    6.300   4.181   3.112   0.000   0.000
WATER IN PROFILE     37.84  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3491E-02   CM
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  DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
   0.8453E+00            0.1261E+00           0.4545E+05           0.3684E-10            0.9458E-04
   0.3155E+01            0.1261E+00           0.4545E+05           0.3684E-10            0.9459E-04
   0.4845E+01            0.1329E+00           0.3125E+05           0.9126E-10            0.1528E-03
   0.7155E+01            0.1515E+00           0.1229E+05           0.8736E-09            0.5049E-03
   0.8845E+01            0.1633E+00           0.7182E+04           0.3211E-08            0.1005E-02
   0.1115E+02            0.1772E+00           0.4023E+04           0.1306E-07            0.2112E-02
   0.1285E+02            0.1860E+00           0.2852E+04           0.3006E-07            0.3281E-02
   0.1515F+02            0.1961E+00           0.1955E+04           0.7493E-07            0.5320E-02
   0.1685E+02            0.2024E+00           0.1561E+04           0.1293E-06            0.7099E-02
   0.1915E+02            0.2095F+00           0.1222E+04           0.2341E-06            0.9719E-02
   0.2148E+02            0.2139E+00           0.1051E+04           0.3366E-06            0.1178E-01
   0.2552E+02            0.2190E+00           0.8891E+03           0.5052E-06            0.1460E-01
   0.2763E+02            0.2222E+00           0.9021E+03           0.6483E-06            0.1666E-01
   0.2937E+02            0.2259E+00           0.7148E+03           0.8568E-06            0.1931E-01
   0.3063E+02            0.2507E+00           0.3403E+03           0.6383E-02            0.4995E-01
   0.3237E+02            0.3148E+00           0.2388E+04           0.1539E-03            0.1078E-01
   0.3406E+02            0.3390E+00           0.1027E+04           0.8417E-06            0.2906E-01
   0.3694E+02            0.3410E+00           0.9624E+03           0.9747E-06            0.3136E-01
   0.3927E+02            0.3423E+00           0.9219E+03           0.1074E-05            0.3299E-01
   0.4273F+02            0.3438E+00           0.8746E+03           0.1210E-05            0.3509E-01
   0.4527E+02            0.3449E+00           0.8446E+03           0.1309E-05            0.3656E-01
   0.4873E+02            0.3462E+00           0.8093E+03           0.1443E-05            0.3844F-01
   0.5211E+02            0.3470E+00           0.7868E+03           0.1538E-05            0.3974E-01
   0.5789E+02            0.3481E+00           0.7603E+03           0.1661E-05            0.4137E-01
   0.6211E+02            0.3488E+00           0.7436E+03           0.1747E-05            0.4246F-01
   0.6789E+02            0.3496E+00           0.7242E+03           0.1855E-05            0.4381E-01
   0.7211E+02            0.3501E+00           0.7120E+03           0.1927E-05            0.4469E-01
   0.7789E+02            0.3507E+00           0.6981E+03           0.2016E-05            0.4574E-01
   0.8211E+02            0.3511E+00           0.6894E+03           0.2074E-05            0.4642E-01
   0.8789E+02            0.3515E+00           0.6797E+03           0.2141E-05            0.4720E-01
   0.9211E+02            0.3518E+00           0.6739E+03           0.2183E-05            0.4768E-01
   0.9789E+02            0.3521E+00           0.6677E+03           0.2229E-05            0.4820E-01
   0.1021E+03            0.3522E+00           0.6643E+03           0.2255E-05            0.4848E-01
   0.1079E+03            0.3524E+00           0.6613E+03           0.2278E-05            0.4874E-01
   0.1121E+03            0.3524E+00           0.6602E+03           0.2287E-05            0.4884E-01
   0.1179E+03            0.3524E+00           0.6602E+03           0.2287E-05            0.4884F-01
DAY         10      HOUR         8.00
WATER IN PROFILE      37.79  CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010.1609E+000.1662E+000.1839E+000.1981E+000.2117E+000.2206E+000.2264E+000.3377E+000.3409E+000.3436E+000.3459E+00
.3477E+000.3492E+000.3503E+000.3510E+000.3515E+000.3518E+000.3518E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1070E-02   CM
DAY         10      HOUR        16.00
WATER IN PROFILE      37.56  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1596E+000.1611E+000.1763E+000.1913E+000.2053E+000.2162E+000.2237E+000.3363E+000.3400E+000.3429E+000.3452E+00
.3471E+000.3486E+000.3497E+000.3505E+000.3510E+000.3512E+000.3512E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2096E-02   CM
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DAY        10     HOUR       24.00

WATER IN PROFILE      37.56  CM

WATER CONTENT AT THE NODES(CC/CC)

.1257E+000.1257E+000.1565E+000.1789E+000.1954E+000.2073E+000.2163E+000.2230E+000.3358E+000.3393E+000.3421E+000.3445E+00

.3465E+000.3480E+000.3491E+000.3499E+000.3504E+000.3507E+000.3507E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3081E-02   CM


STAGE          1    STAGE DAY        10    DAY NO.        10

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1         30.00000          0.18084          32.56598
   2         90.00000          0.34508          73.30231

            DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)

   PE      AE     TRANS  PRECIP  INFILT    PE      AE     TRANS  PRECIP  INFILT
  0.700   0.284   0.275   0.000   0.000   7.000   4.465   3.387   0.000   0.000

WATER IN PROFILE      37.56  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3081E-02   CM

         DEPTH(CM)      WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
          0.8453E+00          0.1252E+00          0.4772E+05          0.3275E-10          0.8887E-04
          0.3155E+01          0.1252E+00          0.4771E+05          0.3275E-10          0.8888E-04
          0.4845E+01          0.1318E+00          0.3316E+05          0.7904E-10          0.1416E-03
          0.7155E+01          0.1497E+00          0.1337E+05          0.7130E-09          0.4534E-03
          0.8845E+01          0.1609E+00          0.7979E+04          0.2489E-08          0.8784E-03
          0.1115E+02          0.1738E+00          0.4622E+04          0.9333E-08          0.1768E-02
          0.1285E+02          0.1820E+00          0.3331E+04          0.2063E-07          0.2689E-02
          0.1515E+02          0.1915E+00          0.2317E+04          0.4970E-07          0.4281E-02
          0.1685E+02          0.1975E+00          0.1856E+04          0.8501E-07          0.5687E-02
          0.1915E+02          0.2046E+00          0.1447E+04          0.1553E-06          0.7822E-02
          0.2148E+02          0.2091E+00          0.1239E+04          0.2261E-06          0.9542E-02
          0.2552E+02          0.2144E+00          0.1037E+04          0.3479E-06          0.1198E-01
          0.2763E+02          0.2177E+00          0.9286E+03          0.4548E-06          0.1381E-01
          0.2937E+02          0.2216E+00          0.8187E+03          0.6169E-06          0.1623E-01
          0.3063E+02          0.2469E+00          0.3795E+03          0.5641E-02          0.4344E-01
          0.3237E+02          0.3120E+00          0.2647E+04          0.1403E-03          0.9546E-02
          0.3406E+02          0.3366E+00          0.1115E+04          0.6982E-06          0.2637E-01
          0.3694E+02          0.3386E+00          0.1042E+04          0.8144E-06          0.2857E-01
          0.3927E+02          0.3399E+00          0.9957E+03          0.9024E-06          0.3013E-01
          0.4273E+02          0.3416E+00          0.9416E+03          0.1024E-05          0.3217E-01
          0.4527E+02          0.3427E+00          0.9073E+03          0.1114E-05          0.3361E-01
          0.4873E+02          0.3441E+00          0.8668E+03          0.1235E-05          0.3546E-01
          0.5211E+02          0.3450E+00          0.8411E+03          0.1322E-05          0.3674E-01
          0.5789E+02          0.3461E+00          0.8108E+03          0.1437E-05          0.3836E-01
          0.6211E+02          0.3469E+00          0.7917E+03          0.1516E-05          0.3945E-01
          0.6789E+02          0.3477E+00          0.7696E+03          0.1617E-05          0.4079E-01
          0.7211E+02          0.3483E+00          0.7558E+03          0.1684E-05          0.4166E-01
          0.7789E+02          0.3489E+00          0.7399E+03          0.1767E-05          0.4272E-01
          0.8211E+02          0.3493E+00          0.7301E+03          0.1821E-05          0.4339E-01
          0.8789E+02          0.3498E+00          0.7192E+03          0.1884E-05          0.4417E-01
          0.9211E+02          0.3501E+00          0.7127E+03          0.1924E-05          0.4464E-01
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        0.9789E+02              0.3504E+00              0.7057E+03              0.1967E-05              0.4516E-01
        0.1021E+03              0.3505E+00              0.7020E+03              0.1990E-05              0.4544E-01
        0.1079E+03              0.3507E+00              0.6986E+03              0.2012E-05              0.4570E-01
        0.1121E+03              0.3507E+00              0.6974E+03              0.2020E-05              0.4579E-01
        0.1179E+03              0.3507E+00              0.6974E+03              0.2020E-05              0.4579E-01

ROOT DENSITY (GM PER CC) AT GAUSS POINTS

  DEPTH     DENSITY
     0.85       4.79
     3.15       3.99
     4.85       3.48
     7.15       2.89
     8.85       2.53
    11.15       2.10
    12.85       1.84
    15.15       1.53
    16.85       1.33
    19.15       1.11
    21.48       0.92
    25.52       0.67
    27.63       0.56
    29.37       0.49
    30.63       0.44
    32.37       0.39
    34.06       0.34
    36.94       0.27
    39.27       0.22
    42.73       0.17
    45.27       0.14
    48.73       0.10
    52.11       0.08
    57.89       0.05
    62.11       0.04
    67.89       0.02
    72.11       0.02
    77.89       0.01
    82.11       0.01
    87.89       0.00
    92.11       0.00
    97.89       0.00
   102.11       0.00
   107.89       0.00
   112.11       0.00
   117.89       0.00

DAY          11      HOUR         8.00

WATER IN PROFILE      38.52   CM

WATER CONTENT AT THE NODES(CC/CC)

.2880E+000.2448E+000.2015E+000.1829E+000.1987E+000.2083E+000.2165E+000.2226E+000.3355E+000.3388E+000.3416E+000.3439E+00

.3458E+000.3474E+000.3485E+000.3493E+000.3498E+000.3501E+000.3501E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9450E-03    CM

DAY          11      HOUR        16.00

WATER IN PROFILE      38.92   CM
WATER CONTENT AT THE NODES(CC/CC)
.2883E+000.2565E+000.2431E+000.2261E+000.2106E+000.2095E+000.2165E+000.2224E+000.3353E+000.3384E+000.3411E+000.3434E+00
.3453E+000.3468E+000.3479E+000.3488E+000.3493E+000.3496E+000.3496E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1852E-02   CM
DAY        11     HOUR       24.00
WATER IN PROFILE     39.87  CM
WATER CONTENT AT THE NODES(CC/CC)
.3152E+000.2940E+000.2853E+000.2739E+000.2594E+000.2406E+000.2254E+000.2226E+000.3352E+000.3381E+000.3407E+000.3429E+00
.3448E+000.3462E+000.3474E+000.3482E+000.3487E+000.3490E+000.3490E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2723E-02   CM

STAGE          2    STAGE DAY          1    DAY NO.        11
  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1         30.00000          0.26157       110.94191
   2         90.00000          0.34345        71.74960
             DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)
  PE      AE      TRANS  PRECIP  INFILT    PE       AE     TRANS  PRECIP  INFILT
 0.700   0.000    0.000   3.000   2.300   7.700    4.465   3.387   3.000   2.300
WATER IN PROFILE     39.87  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2723E-02   CM
        DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00           0.3104E+00           0.7429E+02          0.2060E-03            0.3509E+00
         0.3155E+01           0.2980E+00           0.9935E+02          0.1019E-03            0.2418E+00
         0.4845E+01           0.2916E+00           0.1160E+03          0.7006E-04            0.1984E+00
         0.7155E+01           0.2865E+00           0.1314E+03          0.5176E-04            0.1690E+00
         0.8845E+01           0.2823E+00           0.1462E+03          0.3999E-04            0.1475E+00
         0.1115E+02           0.2757E+00           0.1728E+03          0.2668E-04            0.1190E+00
         0.1285E+02           0.2702E+00           0.1994E+03          0.1886E-04            0.9909E-01
         0.1515E+02           0.2618E+00           0.2499E+03          0.1091E-04            0.7419E-01
         0.1685E+02           0.2547E+00           0.3039E+03          0.6798E-05            0.5775E-01
         0.1915E+02           0.2438E+00           0.4153E+03          0.3192E-05            0.3871E-01
         0.2148E+02           0.2366E+00           0.5135E+03          0.1909E-05            0.2950E-01
         0.2552E+02           0.2280E+00           0.6689E+03          0.1006E-05            0.2102E-01
         0.2763E+02           0.2243E+00           0.7502E+03          0.7623E-06            0.1815E-01
         0.2937E+02           0.2230E+00           0.7824E+03          0.6885E-06            0.1720E-01
         0.3063E+02           0.2463E+00           0.3854E+03          0.5571E-02            0.4259E-01
         0.3237E+02           0.3114E+00           0.2711E+04          0.1362E-03            0.9281E-02
         0.3406E+02           0.3358E+00           0.1146E+04          0.6560E-06            0.2553E-01
         0.3694E+02           0.3375E+00           0.1082E+04          0.7477E-06            0.2733E-01
         0.3927E+02           0.3387E+00           0.1040E+04          0.8177E-06            0.2863E-01
         0.4273E+02           0.3401E+00           0.9890E+03          0.9162E-06            0.3037E-01
         0.4527E+02           0.3412E+00           0.9560E+03          0.9895E-06            0.3161E-01
         0.4873E+02           0.3424E+00           0.9160E+03          0.1090E-05            0.3323E-01
         0.5211E+02           0.3433E+00           0.8902E+03          0.1163E-05            0.3437E-01
        0.5789E+02          0.3444E+00          0.8592E+03          0.1260E-05          0.3583E-01
        0.6211E+02          0.3451E+00          0.8394E+03          0.1328E-05          0.3683E-01
        0.6789E+02          0.3459E+00          0.8160E+03          0.1416E-05          0.3807E-01
        0.7211E+02          0.3465E+00          0.8013E+03          0.1475E-05          0.3890E-01
        0.7789E+02          0.3471E+00          0.7842E+03          0.1549E-05          0.3990E-01
        0.8211E+02          0.3476E+00          0.7736E+03          0.1598E-05          0.4054E-01
        0.8789E+02          0.3480E+00          0.7616E+03          0.1655E-05          0.4129E-01
        0.9211E+02          0.3483E+00          0.7544E+03          0.1691E-05          0.4175E-01
        0.9789E+02          0.3486E+00          0.7468E+03          0.1730E-05          0.4225E-01
        0.1021E+03          0.3488E+00          0.7427E+03          0.1752E-05          0.4253E-01
        0.1079E+03          0.3490E+00          0.7390E+03          0.1772E-05          0.4278E-01
        0.1121E+03          0.3490E+00          0.7377E+03          0.1779E-05          0.4287E-01
        0.1179E+03          0.3490E+00          0.7377E+03          0.1779E-05          0.4287E-01
DAY         12     HOUR        8.00
WATER IN PROFILE      39.81   CM
WATER CONTENT AT THE NODES(CC/CC)
.2580E+000.2622E+000.2630E+000.2633E+000.2605E+000.2557E+000.2496E+000.2438E+000.3458E+000.3429E+000.3421E+000.3429E+00
.3443E+000.3457E+000.3469E+000.3477E+000.3482E+000.3485E+000.3485E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.8367E-03   CM
DAY         12     HOUR       16.00
WATER IN PROFILE      39.20   CM
WATER CONTENT AT THE NODES(CC/CC)
.1874E+000.2119E+000.2282E+000.2404E+000.2459E+000.2482E+000.2486E+000.2477E+000.3490E+000.3474E+000.3459E+000.3451E+00
.3451E+000.3457E+000.3465E+000.3472E+000.3477E+000.3479E+000.3479E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1641E-02   CM
DAY         12     HOUR       24.00
WATER IN PROFILE      39.18   CM
WATER CONTENT AT THE NODES(CC/CC)
.2206E+000.2207E+000.2263E+000.2331E+000.2382E+000.2417E+000.2437E+000.2445E+000.3475E+000.3473E+000.3468E+000.3464E+00
.3461E+000.3462E+000.3465E+000.3469E+000.3473E+000.3475E+000.3475E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2417E-02   CM

STAGE          2    STAGE DAY          2    DAY NO.        12
 LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1        30.00000        0.23432          84.49334
   2        90.00000        0.34512          73.34400
           DAILY VALUES (CM)                        CUMULATIVE VALUES (CM)
   PE      AE      TRANS   PRECIP   INFILT     PE       AE     TRANS   PRECIP   INFILT
  0.700   0.696    0.626    0.000    0.000    8.400    5.161    4.014    3.000    2.300
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WATER IN PROFILE      39.18  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2417E-02    CM
        DEPTH(CM)        WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00           0.2200E+00           0.8618E+03           0.5449E-06           0.1520E-01
         0.3155E+01           0.2201E+00           0.8594E+03           0.5485E-06           0.1525E-01
         0.4845E+01           0.2214E+00           0.8235E+03           0.6082E-06           0.1611E-01
         0.7155E+01           0.2249E+00           0.7358E+03           0.7990E-06           0.1861E-01
         0.8845E+01           0.2277E+00           0.6744E+03           0.9864E-06           0.2080E-01
         0.1115E+02           0.2317E+00           0.5953E+03           0.1334E-05           0.2441E-01
         0.1285E+02           0.2343E+00           0.5501E+03           0.1616E-05           0.2701E-01
         0.1515E+02           0.2374E+00           0.5019E+03           0.2017E-05           0.3037E-01
         0.1685E+02           0.2392E+00           0.4748E+03           0.2307E-05           0.3260E-01
         0.1915E+02           0.2412E+00           0.4471E+03           0.2668E-05           0.3521E-01
         0.2148E+02           0.2424E+00           0.4322E+03           0.2897E-05           0.3678E-01
         0.2552E+02           0.2435E+00           0.4183E+03           0.3136E-05           0.3835E-01
         0.2763E+02           0.2441E+00           0.4114E+03           0.3264E-05           0.3917E-01
         0.2937E+02           0.2445E+00           0.4063E+03           0.3364E-05           0.3981E-01
         0.3063E+02           0.2664E+00           0.2205E+03           0.1051E-01           0.8708E-01
         0.3237E+02           0.3259E+00           0.1613E+04           0.2154E-03           0.1709E-01
         0.3406E+02           0.3476E+00           0.7738E+03           0.1597E-05           0.4053E-01
         0.3694E+02           0.3474E+00           0.7782E+03           0.1576E-05           0.4025E-01
         0.3927E+02           0.3472E+00           0.7825E+03           0.1557E-05           0.3999E-01
         0.4273E+02           0.3469E+00           0.7899E+03           0.1524E-05           0.3955E-01
         0.4527E+02           0.3467E+00           0.7954E+03           0.1500E-05           0.3924E-01
         0.4873E+02           0.3464E+00           0.8028E+03           0.1469E-05           0.3881E-01
         0.5211E+02           0.3463E+00           0.8070E+03           0.1452E-05           0.3857E-01
         0.5789E+02           0.3461E+00           0.8111E+03           0.1435E-05           0.3834E-01
         0.6211E+02           0.3461E+00           0.8122E+03           0.1431E-05           0.3828E-01
         0.6789E+02           0.3461E+00           0.8109E+03           0.1436E-05           0.3835E-01
         0.7211E+02           0.3462E+00           0.8084E+03           0.1446E-05           0.3849E-01
         0.7789E+02           0.3464E+00           0.8031E+03           0.1468E-05           0.3880E-01
         0.8211E+02           0.3466E+00           0.7987E+03           0.1486E-05           0.3905E-01
         0.8789E+02           0.3468E+00           0.7920E+03           0.1515E-05           0.3943E-01
         0.9211E+02           0.3470E+00           0.7876E+03           0.1534E-05           0.3969E-01
         0.9789E+02           0.3472E+00           0.7821E+03           0.1558E-05           0.4002E-01
         0.1021E+03           0.3473E+00           0.7790E+03           0.1572E-05           0.4021E-01
         0.1079E+03           0.3475E+00           0.7760E+03           0.1586E-05           0.4039E-01
         0.1121E+03           0.3475E+00           0.7749E+03           0.1591E-05           0.4046E-01
         0.1179E+03           0.3475E+00           0.7749E+03           0.1591E-05           0.4046E-01
DAY         13      HOUR        8.00
WATER IN PROFILE      39.11  CM
WATER CONTENT AT THE NODES(CC/CC)
.2008E+000.2235E+000.2275E+000.2328E+000.2362E+000.2388E+000.2406E+000.2418E+000.3460E+000.3464E+000.3465E+000.3465E+00
.3465E+000.3465E+000.3467E+000.3469E+000.3471E+000.3472E+000.3472E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7528E-03    CM
DAY         13      HOUR        16.00
WATER IN PROFILE      38.51  CM
WATER CONTENT AT THE NODES(CC/CC)
.4318E-010.1913E+000.2122E+000.2265E+000.2331E+000.2365E+000.2387E+000.2400E+000.3451E+000.3457E+000.3461E+000.3464E+00
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.3465E+000.3466E+000.3467E+000.3469E+000.3469E+000.3470E+000.3470E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1493E-02   CM
DAY         13     HOUR       24.00
WATER IN PROFILE      38.49  CM
WATER CONTENT AT THE NODES(CC/CC)
.1614E+000.1614E+000.2037E+000.2195E+000.2279E+000.2330E+000.2362E+000.2381E+000.3441E+000.3449E+000.3456E+000.3461E+00
.3464E+000.3466E+000.3467E+000.3468E+000.3469E+000.3469E+000.3469E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2226E-02   CM

STAGE          2    STAGE DAY          3    DAY NO.         13

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1        30.00000         0.21309         63.87635
    2        90.00000         0.34457         72.81699

            DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)

  PE       AE      TRANS   PRECIP   INFILT     PE       AE     TRANS   PRECIP   INFILT
 0.700    0.691    0.626    0.000    0.000    9.100    5.851    4.640    3.000    2.300

WATER IN PROFILE      38.49  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2226E-02   CM
      DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
       0.8453E+00           0.1605E+00           0.8140E+04           0.2371E-08           0.8562E-03
       0.3155E+01           0.1605E+00           0.8137E+04           0.2373E-08           0.8566E-03
       0.4845E+01           0.1697E+00           0.5472E+04           0.6203E-08           0.1424E-02
       0.7155E+01           0.1948E+00           0.2047E+04           0.6704E-07           0.5016E-02
       0.8845E+01           0.2073E+00           0.1314E+04           0.1961E-06           0.8850E-02
       0.1115E+02           0.2164E+00           0.9689E+03           0.4102E-06           0.1308E-01
       0.1285E+02           0.2215E+00           0.8211E+03           0.6126E-06           0.1617E-01
       0.1515E+02           0.2263E+00           0.7039E+03           0.8893E-06           0.1969E-01
       0.1685E+02           0.2292E+00           0.6438E+03           0.1104E-05           0.2208E-01
       0.1915E+02           0.2322E+00           0.5877E+03           0.1377E-05           0.2481E-01
       0.2148E+02           0.2339E+00           0.5572E+03           0.1566E-05           0.2656E-01
       0.2552E+02           0.2357E+00           0.5276E+03           0.1788E-05           0.2849E-01
       0.2763E+02           0.2368E+00           0.5109E+03           0.1932E-05           0.2968E-01
       0.2937E+02           0.2379E+00           0.4943E+03           0.2093E-05           0.3097E-01
       0.3063E+02           0.2606E+00           0.2578E+03           0.8804E-02           0.7130E-01
       0.3237E+02           0.3218E+00           0.1864E+04           0.1898E-03           0.1442E-01
       0.3406E+02           0.3443E+00           0.8611E+03           0.1254E-05           0.3574E-01
       0.3694E+02           0.3448E+00           0.8468E+03           0.1302E-05           0.3645E-01
       0.3927E+02           0.3451E+00           0.8379E+03           0.1333E-05           0.3690E-01
       0.4273E+02           0.3455E+00           0.8279E+03           0.1370E-05           0.3743E-01
       0.4527E+02           0.3457E+00           0.8217E+03           0.1394E-05           0.3776E-01
       0.4873E+02           0.3460E+00           0.8148E+03           0.1421E-05           0.3814E-01
       0.5211E+02           0.3461E+00           0.8106E+03           0.1437E-05           0.3837E-01
       0.5789E+02           0.3463E+00           0.8059E+03           0.1456E-05           0.3863E-01
       0.6211E+02           0.3464E+00           0.8031E+03           0.1468E-05           0.3879E-01
       0.6789E+02           0.3465E+00           0.8001E+03           0.1481E-05           0.3897E-01
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        0.7211E+02          0.3466E+00          0.7982E+03          0.1488E-05          0.3907E-01
        0.7789E+02          0.3467E+00          0.7961E+03          0.1497E-05          0.3919E-01
        0.8211E+02          0.3467E+00          0.7948E+03          0.1503E-05          0.3927E-01
        0.8789E+02          0.3468E+00          0.7933E+03          0.1509E-05          0.3936E-01
        0.9211E+02          0.3468E+00          0.7923E+03          0.1513E-05          0.3941E-01
        0.9789E+02          0.3469E+00          0.7913E+03          0.1518E-05          0.3947E-01
        0.1021E+03          0.3469E+00          0.7907E+03          0.1520E-05          0.3951E-01
        0.1079E+03          0.3469E+00          0.7902E+03          0.1523E-05          0.3954E-01
        0.1121E+03          0.3469E+00          0.7900E+03          0.1524E-05          0.3955E-01
        0.1179E+03          0.3469E+00          0.7900E+03          0.1524E-05          0.3955E-01

DAY          14     HOUR         8.00

WATER IN PROFILE      38.42  CM

WATER CONTENT AT THE NODES(CC/CC)

.1252E+000.1786E+000.2065E+000.2177E+000.2250E+000.2303E+000.2338E+000.2361E+000.3429E+000.3441E+000.3450E+000.3456E+00

.3461E+000.3464E+000.3466E+000.3467E+000.3468E+000.3469E+000.3469E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.7293E-03   CM

DAY          14     HOUR        16.00

WATER IN PROFILE      37.86  CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1399E+000.1707E+000.2093E+000.2227E+000.2286E+000.2320E+000.2344E+000.3420E+000.3433E+000.3444E+000.3452E+00

.3458E+000.3462E+000.3465E+000.3466E+000.3467E+000.3468E+000.3468E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1455E-02   CM

DAY          14     HOUR        24.00

WATER IN PROFILE      37.83  CM

WATER CONTENT AT THE NODES(CC/CC)

.1101E+000.1101E+000.1827E+000.2062E+000.2183E+000.2255E+000.2299E+000.2329E+000.3411E+000.3426E+000.3438E+000.3447E+00

.3454E+000.3459E+000.3463E+000.3465E+000.3466E+000.3467E+000.3467E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.2176E-02   CM

STAGE          2    STAGE DAY          4    DAY NO.        14
  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000          0.19422      45.56208
    2        90.00000          0.34363      71.92474
            DAILY VALUES (CM)                 CUMULATIVE VALUES (CM)

   PE       AE      TRANS   PRECIP  INFILT     PE       AE      TRANS  PRECIP  INFILT
  0.700    0.655    0.626    0.000    0.000    9.800    6.506    5.266   3.000   2.300

WATER IN PROFILE      37.83  CM
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FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2176E-02   CM
        DEPTH(CM)      WATER CONTENT(CC/CC)   SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00          0.1099E+00           0.1204E+06          0.3482E-11          0.2716E-04
         0.3155E+01          0.1099E+00           0.1204E+06          0.3483E-11          0.2716E-04
         0.4845E+01          0.1251E+00           0.4785E+05          0.3254E-10          0.8856E-04
         0.7155E+01          0.1667E+00           0.6210F+04          0.4566E-08          0.1211E-02
         0.8845E+01          0.1871E+00           0.2736E+04          0.3321E-07          0.3459E-02
         0.1115E+02          0.2011E+00           0.1637E+04          0.1153E-06          0.6681E-02
         0.1285E+02          0.2088E+00           0.1252E+04          0.2207E-06          0.9422E-02
         0.1515E+02          0.2159E+00           0.9864E+03          0.3929E-06          0.1278E-01
         0.1685E+02          0.2200E+00           0.8624E+03          0.5440E-06          0.1518E-01
         0.1915E+02          0.2241E+00           0.7552E+03          0.7500E-06          0.1799E-01
         0.2148E+02          0.2266E+00           0.6990E+03          0.9047E-06          0.1987E-01
         0.2552E+02          0.2291E+00           0.6453E+03          0.1098E-05          0.2201E-01
         0.2763E+02          0.2307E+00           0.6151E+03          0.1233F-05          0.2340E-01
         0.2937E+02          0.2323E+00           0.5843E+03          0.1396E-05          0.2500E-01
         0.3063E+02          0.2558E+00           0.2945E+03          0.7571E-02          0.6013E-01
         0.3237E+02          0.3183E+00           0.2110E+04          0.1701F-03          0.1246E-01
         0.3406E+02          0.3414E+00           0.9471E+03          0.1011E-05          0.3195E-01
         0.3694E+02          0.3423E+00           0.9205E+03          0.1078E-05          0.3305E-01
         0.3927E+02          0.3429F+00           0.9034E+03          0.1125E-05          0.3378E-01
         0.4273E+02          0.3435E+00           0.8831E+03          0.1184E-05          0.3469E-01
         0.4527E+02          0.3440E+00           0.8701E+03          0.1224E-05          0.3530E-01
         0.4873E+02          0.3445E+00           0.8548E+03          0.1275E-05          0.3605E-01
         0.5211E+02          0.3449F+00           0.8450E+03          0.1308E-05          0.3654E-01
         0.5789F+02          0.3453E+00           0.8337E+03          0.1349E-05          0.3712E-01
         0.6211E+02          0.3455E+00           0.8267E+03          0.1375E-05          0.3749E-01
         0.6789E+02          0.3458E+00           0.8188E+03          0.1405E-05          0.3792E-01
         0.7211E+02          0.3460E+00           0.8141E+03          0.1423E-05          0.3818E-01
         0.7789E+02          0.3462E+00           0.8088E+03          0.1444E-05          0.3847E-01
         0.8211E+02          0.3463E+00           0.8057E+03          0.1457E-05          0.3865E-01
         0.8789E+02          0.3464E+00           0.8024E+03          0.1471F-05          0.3883E-01
         0.9211E+02          0.3465E+00           0.8004E+03          0.1479E-05          0.3895E-01
         0.9789E+02          0.3466F+00           0.7984E+03          0.1487E-05          0.3906E-01
         0.1021E+03          0.3466E+00           0.7974E+03          0.1492E-05          0.3912E-01
         0.1079E+03          0.3467E+00           0.7965E+03          0.1496E-05          0.3917E-01
         0.1121E+03          0.3467E+00           0.7961E+03          0.1497E-05          0.3919E-01
         0.1179E+03          0.3467E+00           0.7961E+03          0.1497E-05          0.3919E-01
DAY        15     HOUR        8.00
WATER IN PROFILE     37.75  CM
WATER CONTENT AT THE NODES(CC/CC)
.4695E-010.1375E+000.1833E+000.2049E+000.2168E+000.2235E+000.2280E+000.2312E+000.3401E+000.3418E+000.3431E+000.3442E+00
.3450E+000.3456E+000.3460E+000.3463E+000.3465E+000.3466E+000.3466E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7149E-03   CM
DAY        15     HOUR       16.00
WATER IN PROFILE     37.22  CM
WATER CONTENT AT THE NODES(CC/CC)
.4505E-010.1471E+000.1562E+000.1383E+000.1864E+000.2189E+000.2264E+000.2298E+000.3393E+000.3411E+000.3425E+000.3437E+00
.3446E+000.3453E+000.3458E+000.3461E+000.3463E+000.3464E+000.3464E+00
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FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1422E-02   CM

DAY        15     HOUR        24.00

WATER IN PROFILE      37.22  CM

WATER CONTENT AT THE NODES(CC/CC)

.1190E+000.1190E+000.1457E+000.1529E+000.1975E+000.2135E+000.2221E+000.2272E+000.3380E+000.3402E+000.3419E+000.3432E+00

.3442E+000.3450E+000.3455E+000.3459E+000.3461E+000.3462E+000.3462E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2121E-02   CM

STAGE          2    STAGE DAY          5    DAY NO.        15

  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000         0.17727          29.10636
    2        90.00000         0.34251          70.85764

            DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)

   PE      AE      TRANS  PRECIP  INFILT     PE       AE     TRANS  PRECIP  INFILT
 0.700   0.618   0.616   0.000   0.000  10.500   7.124   5.882   3.000   2.300

WATER IN PROFILE      37.22  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2121E-02   CM

        DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00          0.1185E+00          0.7038E+05          0.1278E-10          0.5402E-04
         0.3155E+01          0.1185E+00          0.7037E+05          0.1278E-10          0.5403E-04
         0.4845E+01          0.1245E+00          0.4972E+05          0.2964E-10          0.8431E-04
         0.7155E+01          0.1407E+00          0.2081E+05          0.2442E-09          0.2572E-03
         0.8845E+01          0.1474E+00          0.1491E+05          0.5477E-09          0.3944E-03
         0.1115E+02          0.1497E+00          0.1339E+05          0.7105E-09          0.4526E-03
         0.1285E+02          0.1604E+00          0.8186E+04          0.2339E-08          0.8500E-03
         0.1515E+02          0.1874E+00          0.2702E+04          0.3425E-07          0.3516E-02
         0.1685E+02          0.2008E+00          0.1654E+04          0.1124E-06          0.6592E-02
         0.1915E+02          0.2103E+00          0.1190E+04          0.2494E-06          0.1005E-01
         0.2148E+02          0.2156E+00          0.9957E+03          0.3841E-06          0.1263E-01
         0.2552E+02          0.2206E+00          0.8441E+03          0.5729E-06          0.1560E-01
         0.2763E+02          0.2236E+00          0.7684E+03          0.7194E-06          0.1760E-01
         0.2937E+02          0.2265E+00          0.6997E+03          0.9023E-06          0.1984E-01
         0.3063E+02          0.2510E+00          0.3373E+03          0.6479E-02          0.5052E-01
         0.3237E+02          0.3148E+00          0.2390E+04          0.1527E-03          0.1077E-01
         0.3406E+02          0.3386E+00          0.1040E+04          0.8169E-06          0.2861E-01
         0.3694E+02          0.3399E+00          0.9976E+03          0.8985E-06          0.3006E-01
         0.3927E+02          0.3407E+00          0.9711E+03          0.9550E-06          0.3103E-01
         0.4273E+02          0.3416E+00          0.9408E+03          0.1026E-05          0.3221E-01
         0.4527E+02          0.3423E+00          0.9216E+03          0.1075E-05          0.3300E-01
         0.4873E+02          0.3430E+00          0.8992E+03          0.1137E-05          0.3397E-01
         0.5211E+02          0.3435E+00          0.8850E+03          0.1178E-05          0.3461E-01
         0.5789E+02          0.3441E+00          0.8683E+03          0.1230E-05          0.3539E-01
         0.6211E+02          0.3444E+00          0.8579E+03          0.1264E-05          0.3590E-01
         0.6789E+02          0.3448E+00          0.8459E+03          0.1305E-05          0.3650E-01
         0.7211E+02          0.3451E+00          0.8384E+03          0.1332E-05          0.3688E-01
         0.7789E+02          0.3454E+00          0.8300E+03          0.1362E-05          0.3732E-01
         0.8211E+02          0.3456E+00          0.8248E+03          0.1382E-05          0.3759E-01
         0.8789E+02          0.3458E+00          0.8192E+03          0.1403E-05          0.3790E-01
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          0.9211E+02          0.3459E+00          0.8158E+03          0.1417E-05          0.3808E-01
          0.9789E+02          0.3461E+00          0.8123E+03          0.1430E-05          0.3827E-01
          0.1021E+03          0.3461E+00          0.8104E+03          0.1438E-05          0.3838E-01
          0.1079E+03          0.3462E+00          0.8088E+03          0.1445E-05          0.3847E-01
          0.1121E+03          0.3462E+00          0.8082E+03          0.1447E-05          0.3851E-01
          0.1179E+03          0.3462E+00          0.8082E+03          0.1447E-05          0.3851E-01
DAY          16      HOUR         8.00
WATER IN PROFILE      37.13   CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010.1510E+000.1498E+000.1529E+000.1863E+000.2129E+000.2201E+000.2252E+000.3368E+000.3392E+000.3411E+000.3426E+00
.3438E+000.3446E+000.3452E+000.3456E+000.3459E+000.3460E+000.3460E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6879E-03    CM
DAY          16      HOUR        16.00
WATER IN PROFILE      36.59   CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1571E+000.1480E+000.1547E+000.1303E+000.1814E+000.2106E+000.2222E+000.3356E+000.3384E+000.3404E+000.3420E+00
.3433E+000.3442E+000.3449E+000.3453E+000.3456E+000.3458E+000.3458E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1364E-02    CM
DAY          16      HOUR        24.00
WATER IN PROFILE      36.59   CM
WATER CONTENT AT THE NODES(CC/CC)
.1211E+000.1211E+000.1411E+000.1490E+000.1413E+000.1900E+000.2087E+000.2183E+000.3331E+000.3367E+000.3393E+000.3413E+00
.3427E+000.3438E+000.3445E+000.3450E+000.3453E+000.3455E+000.3455E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2028E-02    CM

STAGE          2    STAGE DAY          6    DAY NO.        16
  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1        30.00000          0.16200         14.28273
   2        90.00000          0.34091         69.33372
              DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)
   PE      AE     TRANS  PRECIP  INFILT    PE      AE    TRANS  PRECIP  INFILT
 0.700   0.622   0.616   0.000   0.000  11.200   7.746   6.498   3.000   2.300
WATER IN PROFILE      36.59   CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2028E-02    CM
        DEPTH(CM)      WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00          0.1207E+00          0.6176E+05          0.1754E-10          0.6387E-04
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     0.3155E+01          0.1207E+00          0.6175E+05          0.1754E-10          0.6387E-04
     0.4845E+01          0.1251E+00          0.4798E+05          0.3232E-10          0.8825E-04
     0.7155E+01          0.1370E+00          0.2512E+05          0.1548E-09          0.2022E-03
     0.8845E+01          0.1431E+00          0.1844E+05          0.3274E-09          0.3004E-03
     0.1115E+02          0.1478E+00          0.1464E+05          0.5723E-09          0.4077E-03
     0.1285E+02          0.1474E+00          0.1490E+05          0.5488E-09          0.3948E-03
     0.1515E+02          0.1417E+00          0.1972E+05          0.2783E-09          0.2757E-03
     0.1685E+02          0.1502E+00          0.1307E+05          0.7531E-09          0.4668E-03
     0.1915E+02          0.1789E+00          0.3761E+04          0.1537E-07          0.2302E-02
     0.2148E+02          0.1935E+00          0.2150E+04          0.5952E-07          0.4710E-02
     0.2552E+02          0.2047E+00          0.1440E+04          0.1572E-06          0.7872E-02
     0.2763E+02          0.2109E+00          0.1166E+04          0.2622E-06          0.1032E-01
     0.2937E+02          0.2165E+00          0.9659E+03          0.4133E-06          0.1313E-01
     0.3063E+02          0.2428E+00          0.4267E+03          0.4925E-02          0.3739E-01
     0.3237E+02          0.3091E+00          0.2943E+04          0.1280E-03          0.8431E-02
     0.3406E+02          0.3341E+00          0.1212E+04          0.5778E-06          0.2390E-01
     0.3694E+02          0.3361E+00          0.1132E+04          0.6749E-06          0.2591E-01
     0.3927E+02          0.3374E+00          0.1084E+04          0.7449E-06          0.2727E-01
     0.4273E+02          0.3389E+00          0.1030E+04          0.8351E-06          0.2894E-01
     0.4527E+02          0.3399E+00          0.9979E+03          0.8980E-06          0.3005E-01
     0.4873E+02          0.3410E+00          0.9615E+03          0.9767E-06          0.3140E-01
     0.5211E+02          0.3417E+00          0.9391E+03          0.1030E-05          0.3227E-01
     0.5789E+02          0.3425E+00          0.9140E+03          0.1095E-05          0.3332E-01
     0.6211E+02          0.3430E+00          0.8985E+03          0.1139E-05          0.3400E-01
     0.6789E+02          0.3436E+00          0.8811E+03          0.1190E-05          0.3479E-01
     0.7211E+02          0.3440E+00          0.8704E+03          0.1224E-05          0.3529E-01
     0.7789E+02          0.3444E+00          0.8584E+03          0.1263E-05          0.3587E-01
     0.8211E+02          0.3447E+00          0.8510E+03          0.1287E-05          0.3624E-01
     0.8789E+02          0.3450E+00          0.8429E+03          0.1316E-05          0.3665E-01
     0.9211E+02          0.3451E+00          0.8381E+03          0.1333E-05          0.3689E-01
     0.9789E+02          0.3453E+00          0.8331E+03          0.1351E-05          0.3716E-01
     0.1021E+03          0.3454E+00          0.8304E+03          0.1361E-05          0.3730E-01
     0.1079E+03          0.3455E+00          0.8280E+03          0.1370E-05          0.3743E-01
     0.1121E+03          0.3455E+00          0.8271E+03          0.1373E-05          0.3747E-01
     0.1179E+03          0.3455E+00          0.8271E+03          0.1373E-05          0.3747E-01
DAY        17     HOUR        8.00
WATER IN PROFILE      36.51  CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010.1531E+000.1454E+000.1493E+000.1438E+000.1849E+000.2066E+000.2169E+000.3321E+000.3356E+000.3383E+000.3405E+00
.3421E+000.3433E+000.3441E+000.3447E+000.3450E+000.3452E+000.3452E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6506E-03   CM
DAY        17     HOUR       16.00
WATER IN PROFILE      35.97  CM
WATER CONTENT AT THE NODES(CC/CC)
.4060E-010.1578E+000.1478E+000.1481E+000.1463E+000.1525E+000.1554E+000.1904E+000.3242E+000.3334E+000.3374E+000.3398E+00
.3415E+000.3428E+000.3437E+000.3443E+000.3447E+000.3449E+000.3449E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1287E-02   CM
DAY        17     HOUR       24.00
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WATER IN PROFILE      35.97  CM

WATER CONTENT AT THE NODES(CC/CC)

.1280E+000.1280E+000.1462E+000.1466E+000.1475E+000.1508E+000.1661E+000.1980E+000.3229E+000.3298E+000.3348E+000.3383E+00

.3406E+000.3422E+000.3432E+000.3439E+000.3443E+000.3446E+000.3446E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1908E-02   CM

STAGE         2    STAGE DAY         7    DAY NO.        17

  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
   1        30.00000        0.14896          1.61689
   2        90.00000        0.33819         66.74989

           DAILY VALUES (CM)                     CUMULATIVE VALUES (CM)

  PE      AE      TRANS  PRECIP  INFILT    PE      AE     TRANS  PRECIP  INFILT
 0.700   0.621    0.616   0.000   0.000  11.900   8.366   7.113   3.000   2.300

WATER IN PROFILE      35.97  CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1908E-02   CM

      DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
       0.8453E+00          0.1270E+00          0.4319E+05          0.4168E-10          0.1010E-03
       0.3155E+01          0.1270E+00          0.4319E+05          0.4168E-10          0.1010E-03
       0.4845E+01          0.1308E+00          0.3487E+05          0.6999E-10          0.1328E-03
       0.7155E+01          0.1414E+00          0.2004E+05          0.2675E-09          0.2700E-03
       0.8845E+01          0.1456E+00          0.1630E+05          0.4411E-09          0.3517E-03
       0.1115E+02          0.1464E+00          0.1569E+05          0.4838E-09          0.3693E-03
       0.1285E+02          0.1468E+00          0.1536E+05          0.5099E-09          0.3797E-03
       0.1515E+02          0.1472E+00          0.1503E+05          0.5367E-09          0.3902E-03
       0.1685E+02          0.1482E+00          0.1438E+05          0.5976E-09          0.4130E-03
       0.1915E+02          0.1502E+00          0.1302E+05          0.7598E-09          0.4689E-03
       0.2148E+02          0.1538E+00          0.1103E+05          0.1137E-08          0.5803E-03
       0.2552E+02          0.1614E+00          0.7815E+04          0.2617E-08          0.9021E-03
       0.2763E+02          0.1715E+00          0.5078E+04          0.7432E-08          0.1567E-02
       0.2937E+02          0.1914E+00          0.2324E+04          0.4933E-07          0.4265E-02
       0.3063E+02          0.2249E+00          0.7374E+03          0.2577E-02          0.1855E-01
       0.3237E+02          0.2965E+00          0.4742E+04          0.8557E-04          0.4811E-02
       0.3406E+02          0.3242E+00          0.1711E+04          0.2650E-06          0.1595E-01
       0.3694E+02          0.3284E+00          0.1478E+04          0.3590E-06          0.1894E-01
       0.3927E+02          0.3310E+00          0.1351E+04          0.4525E-06          0.2105E-01
       0.4273E+02          0.3339E+00          0.1222E+04          0.5680E-06          0.2369E-01
       0.4527E+02          0.3357E+00          0.1149E+04          0.6531E-06          0.2547E-01
       0.4873E+02          0.3377E+00          0.1073E+04          0.7625E-06          0.2761E-01
       0.5211E+02          0.3390E+00          0.1029E+04          0.8373E-06          0.2898E-01
       0.5789E+02          0.3403E+00          0.9843E+03          0.9263E-06          0.3054E-01
       0.6211E+02          0.3411E+00          0.9581E+03          0.9845E-06          0.3153E-01
       0.6789E+02          0.3420E+00          0.9307E+03          0.1051E-05          0.3262E-01
       0.7211E+02          0.3425E+00          0.9144E+03          0.1094E-05          0.3330E-01
       0.7789E+02          0.3431E+00          0.8969E+03          0.1143E-05          0.3407E-01
       0.8211E+02          0.3434E+00          0.8864E+03          0.1174E-05          0.3454E-01
       0.8789E+02          0.3438E+00          0.8750E+03          0.1209E-05          0.3508E-01
       0.9211E+02          0.3441E+00          0.8682E+03          0.1230E-05          0.3540E-01
       0.9789E+02          0.3443E+00          0.8612E+03          0.1253E-05          0.3573E-01
       0.1021E+03          0.3444E+00          0.8574E+03          0.1266E-05          0.3592E-01
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        0.1079E+03          0.3446E+00          0.8541E+03          0.1277E-05          0.3609E-01
        0.1121E+03          0.3446E+00          0.8529E+03          0.1281E-05          0.3615E-01
        0.1179E+03          0.3446E+00          0.8529E+03          0.1281E-05          0.3615E-01
DAY          18     HOUR        8.00
WATER IN PROFILE      35.89   CM
WATER CONTENT AT THE NODES(CC/CC)
.4984E-010.1646E+000.1514E+000.1485E+000.1471E+000.1509E+000.1656E+000.1901E+000.3206E+000.3286E+000.3335E+000.3370E+00
.3396E+000.3414E+000.3427E+000.3435E+000.3440E+000.3442E+000.3442E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6047E-03    CM
DAY          18     HOUR       16.00
WATER IN PROFILE      35.35   CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1378E+000.1254E+000.1478E+000.1478E+000.1481E+000.1624E+000.1628E+000.3044E+000.3223E+000.3309E+000.3358E+00
.3387E+000.3407E+000.3421E+000.3430E+000.3435E+000.3438E+000.3438E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1192E-02    CM
DAY          18     HOUR       24.00
WATER IN PROFILE      35.35   CM
WATER CONTENT AT THE NODES(CC/CC)
.1078E+000.1078E+000.1204E+000.1457E+000.1479E+000.1496E+000.1576E+000.1802E+000.3115E+000.3213E+000.3287E+000.3339E+00
.3375E+000.3399E+000.3414E+000.3424E+000.3430E+000.3433E+000.3433E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1760E-02    CM

STAGE          2    STAGE DAY         8    DAY NO.        18
  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000          0.13931       -7.75184
    2        90.00000          0.33469       63.42547
              DAILY VALUES (CM)                 CUMULATIVE VALUES (CM)
   PE      AE      TRANS  PRECIP  INFILT    PE       AE     TRANS  PRECIP  INFILT
  0.700   0.621    0.616   0.000   0.000  12.600    8.988   7.729   3.000   2.300
WATER IN PROFILE      35.35   CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1760E-02    CM
       DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00          0.1074E+00          0.1426E+06          0.2313E-11          0.2187E-04
        0.3155E+01          0.1074E+00          0.1426E+06          0.2314E-11          0.2187E-04
        0.4845E+01          0.1101E+00          0.1192E+06          0.3568E-11          0.2751E-04
        0.7155E+01          0.1176E+00          0.7472E+05          0.1106E-10          0.5004E-04
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          0.8845E+01           0.1257E+00           0.4646E+05           0.3494E-10           0.9196E-04
          0.1115E+02           0.1404E+00           0.2114E+05           0.2352E-09           0.2522E-03
          0.1285E+02           0.1462E+00           0.1581E+05           0.4750E-09           0.3657E-03
          0.1515E+02           0.1475E+00           0.1488E+05           0.5506E-09           0.3955E-03
          0.1685E+02           0.1483E+00           0.1431E+05           0.6048E-09           0.4156E-03
          0.1915E+02           0.1492E+00           0.1368E+05           0.6746E-09           0.4403E-03
          0.2148E+02           0.1513E+00           0.1240E+05           0.8554E-09           0.4993E-03
          0.2552E+02           0.1560E+00           0.9970E+04           0.1451E-08           0.6603E-03
          0.2763E+02           0.1622E+00           0.7564E+04           0.2832E-08           0.9406E-03
          0.2937E+02           0.1743E+00           0.4522E+04           0.9842E-08           0.1818E-02
          0.3063E+02           0.2067E+00           0.1345E+04           0.1262E-02           0.8589E-02
          0.3237E+02           0.2829E+00           0.8079E+04           0.5378E-04           0.2572E-02
          0.3406E+02           0.3130E+00           0.2550E+04           0.1074E-06           0.9976E-02
          0.3694E+02           0.3191E+00           0.2051E+04           0.1759E-06           0.1289E-01
          0.3927E+02           0.3229E+00           0.1791E+04           0.2390E-06           0.1511E-01
          0.4273E+02           0.3273E+00           0.1535E+04           0.3386E-06           0.1811E-01
          0.4527E+02           0.3300E+00           0.1397E+04           0.4190E-06           0.2023E-01
          0.4873E+02           0.3330E+00           0.1259E+04           0.5304E-06           0.2286E-01
          0.5211E+02           0.3349E+00           0.1182E+04           0.6121E-06           0.2463E-01
          0.5789E+02           0.3369E+00           0.1103E+04           0.7158E-06           0.2671E-01
          0.6211E+02           0.3381E+00           0.1058E+04           0.7866E-06           0.2806E-01
          0.6789E+02           0.3395E+00           0.1011E+04           0.8708E-06           0.2958E-01
          0.7211E+02           0.3403E+00           0.9844E+03           0.9260E-06           0.3054E-01
          0.7789E+02           0.3412E+00           0.9560E+03           0.9895E-06           0.3161E-01
          0.8211E+02           0.3417E+00           0.9392E+03           0.1030E-05           0.3227E-01
          0.8789E+02           0.3423E+00           0.9214E+03           0.1075E-05           0.3301E-01
          0.9211E+02           0.3426E+00           0.9111E+03           0.1103E-05           0.3345E-01
          0.9789E+02           0.3430E+00           0.9005E+03           0.1133E-05           0.3391E-01
          0.1021E+03           0.3431E+00           0.8949E+03           0.1149E-05           0.3416E-01
          0.1079E+03           0.3433E+00           0.8899E+03           0.1164E-05           0.3438E-01
          0.1121E+03           0.3434E+00           0.8881E+03           0.1169E-05           0.3447E-01
          0.1179E+03           0.3434E+00           0.8881E+03           0.1169E-05           0.3447E-01
DAY        19     HOUR        8.00
WATER IN PROFILE      35.27  CM
WATER CONTENT AT THE NODES(CC/CC)
.4495E-010.1318E+000.1223E+000.1461E+000.1478E+000.1493E+000.1597E+000.1779E+000.3112E+000.3220E+000.3281E+000.3329E+00
.3364E+000.3389E+000.3407E+000.3418E+000.3425E+000.3428E+000.3428E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.5484E-03   CM
DAY        19     HOUR       16.00
WATER IN PROFILE      34.74  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1233E+000.1140E+000.1450E+000.1483E+000.1469E+000.1615E+000.1537E+000.2801E+000.3015E+000.3226E+000.3314E+00
.3356E+000.3381E+000.3399E+000.3412E+000.3419E+000.3423E+000.3423E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1076E-02   CM
DAY        19     HOUR       24.00
WATER IN PROFILE      34.74  CM
WATER CONTENT AT THE NODES(CC/CC)

.9647E-010.9647E-010.1085E+000.1434E+000.1479E+000.1485E+000.1590E+000.1540E+000.2941E+000.3089E+000.3206E+000.3286E+00

.3339E+000.3371E+000.3392E+000.3405E+000.3413E+000.3417E+000.3417E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1581E-02    CM


STAGE          2    STAGE DAY          9    DAY NO.        19

  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
   1          30.00000          0.13412        -12.79335
   2          90.00000          0.33005         59.01149

           DAILY VALUES (CM)                        CUMULATIVE VALUES (CM)

   PE       AE      TRANS  PRECIP  INFILT     PE        AE     TRANS   PRECIP   INFILT
  0.700    0.616    0.616   0.000   0.000   13.300    9.604    8.344    3.000    2.300

WATER IN PROFILE      34.74   CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1581E-02    CM

        DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00          0.9643E-01          0.3062E+06          0.3635E-12          0.8217E-05
         0.3155E+01          0.9643E-01          0.3062E+06          0.3635E-12          0.8217E-05
         0.4845E+01          0.9910E-01          0.2521E+06          0.5820E-12          0.1054E-04
         0.7155E+01          0.1064E+00          0.1520E+06          0.1979E-11          0.2014E-04
         0.8845E+01          0.1163E+00          0.8055E+05          0.9218E-11          0.4545E-04
         0.1115E+02          0.1362E+00          0.2625E+05          0.1392E-09          0.1911E-03
         0.1285E+02          0.1444E+00          0.1728E+05          0.3832E-09          0.3265E-03
         0.1515E+02          0.1471E+00          0.1517E+05          0.5748E-09          0.3856E-03
         0.1685E+02          0.1481E+00          0.1444E+05          0.5917E-09          0.4108E-03
         0.1915E+02          0.1482E+00          0.1434E+05          0.6017E-09          0.4145E-03
         0.2148E+02          0.1507E+00          0.1277E+05          0.7969E-09          0.4809E-03
         0.2552E+02          0.1572E+00          0.9448E+04          0.1553E-08          0.7074E-03
         0.2763E+02          0.1582E+00          0.9030E+04          0.1844E-08          0.7496E-03
         0.2937E+02          0.1544E+00          0.1073E+05          0.1216E-08          0.6014E-03
         0.3063E+02          0.1826E+00          0.3250E+04          0.1457E-03          0.2776E-02
         0.3237E+02          0.2634E+00          0.1826E+05          0.2539E-04          0.9861E-03
         0.3406E+02          0.2962E+00          0.4788E+04          0.2581E-07          0.4757E-02
         0.3694E+02          0.3051E+00          0.3421E+04          0.5523E-07          0.7061E-02
         0.3927E+02          0.3109E+00          0.2755E+04          0.4016E-07          0.9108E-02
         0.4273E+02          0.3180E+00          0.2128E+04          0.1517E-06          0.1234E-01
         0.4527E+02          0.3224E+00          0.1823E+04          0.2295E-06          0.1480E-01
         0.4873E+02          0.3271E+00          0.1544E+04          0.3316E-06          0.1800E-01
         0.5211E+02          0.3300E+00          0.1399E+04          0.4181E-06          0.2021E-01
         0.5789E+02          0.3330E+00          0.1261E+04          0.5282E-06          0.2282E-01
         0.6211E+02          0.3347E+00          0.1187E+04          0.6060E-06          0.2450E-01
         0.6789E+02          0.3366E+00          0.1115E+04          0.6987E-06          0.2638E-01
         0.7211E+02          0.3377E+00          0.1074E+04          0.7603E-06          0.2757E-01
         0.7789E+02          0.3389E+00          0.1033E+04          [illegible]         0.2887E-01
         0.8211E+02          0.3396E+00          0.1009E+04          [illegible]         0.2967E-01
         0.8789E+02          0.3403E+00          0.9936E+03          0.9276E-06          0.3057E-01
         0.9211E+02          0.3408E+00          0.9692E+03          0.9593E-06          0.3110E-01
         0.9789E+02          0.3412E+00          0.9544E+03          0.9833E-06          0.3167E-01
         0.1021E+03          0.3415E+00          0.9464E+03          0.1012E-05          0.3198E-01
         0.1079E+03          0.3417E+00          0.9395E+03          0.1029E-05          0.3226E-01
         0.1121E+03          0.3418E+00          0.9370E+03          0.1036E-05          0.3236E-01
         0.1179E+03          0.3418E+00          0.9370E+03          0.1036E-05          0.3236E-01
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DAY         20     HOUR        8.00
WATER IN PROFILE      34.65   CM
WATER CONTENT AT THE NODES(CC/CC)
.4261E-010.1132E+000.1072E+000.1439E+000.1474E+000.1493E+000.1558E+000.1592E+000.2960E+000.3101E+000.3209E+000.3276E+00
.3326E+000.3360E+000.3383E+000.3398E+000.3407E+000.3411E+000.3411E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4833E-03    CM
DAY         20     HOUR       16.00
WATER IN PROFILE      34.12   CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1126E+000.1066E+000.1431E+000.1476E+000.1480E+000.1565E+000.1489E+000.2829E+000.2825E+000.3008E+000.3208E+00
.3306E+000.3351E+000.3374E+000.3390E+000.3400E+000.3404E+000.3404E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9443E-03    CM
DAY         20     HOUR       24.00
WATER IN PROFILE      34.12   CM
WATER CONTENT AT THE NODES(CC/CC)
.9013E-010.9013E-010.1030E+000.1417E+000.1474E+000.1487E+000.1555E+000.1479E+000.2847E+000.2909E+000.3071E+000.3198E+00
.3282E+000.3333E+000.3364E+000.3382E+000.3393E+000.3398E+000.3398E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1383E-02    CM

STAGE          2    STAGE DAY         10    DAY NO.         20
  LAYER    THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000          0.13095       -15.86756
    2        90.00000          0.32457        53.80139
              DAILY VALUES (CM)                   CUMULATIVE VALUES (CM)
   PE      AE      TRANS   PRECIP   INFILT    PE      AE     TRANS  PRECIP  INFILT
  0.700   0.616   0.616   0.000    0.000   14.000  10.220   8.960   3.000   2.300
WATER IN PROFILE      34.12   CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1383E-02    CM
       DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00            0.9009E-01          0.4968E+06          0.1126E-12           0.4420E-05
        0.3155E+01            0.9009E-01          0.4968E+06          0.1126E-12           0.4420E-05
        0.4845E+01            0.9289E-01          0.3995E+06          0.1909E-12           0.5844E-05
        0.7155E+01            0.1005E+00          0.2274E+06          0.7471E-12           0.1203E-04
        0.8845E+01            0.1115E+00          0.1092E+06          0.4414E-11           0.3079E-04
        0.1115E+02            0.1336E+00          0.3001E+05          0.1006E-09           0.1609E-03
        0.1285E+02            0.1430E+00          0.1856E+05          0.3222E-09           0.2979E-03
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0.1515E+02      0.1463E+00      0.1576E+05      0.4791E-09      0.3574E-03
0.1685E+02      0.1477E+00      0.1468E+05      0.5683E-09      0.4022E-03
0.1915E+02      0.1484E+00      0.1423E+05      0.6128E-09      0.4185E-03
0.2148E+02      0.1501E+00      0.1311E+05      0.7483E-09      0.4652E-03
0.2552E+02      0.1542E+00      0.1083E+05      0.1188E-08      0.5939E-03
0.2763E+02      0.1540E+00      0.1091E+05      0.1167E-08      0.5883E-03
0.2937E+02      0.1495E+00      0.1348E+05      0.6985E-09      0.4485E-03
0.3063E+02      0.1767E+00      0.4101E+04      0.3634E-03      0.2060E-02
0.3237E+02      0.2556E+00      0.2575E+05      0.1671E-04      0.6586E-03
0.3406E+02      0.2856E+00      0.7259E+04      0.1007E-07      0.2917E-02
0.3694E+02      0.2887E+00      0.6403E+04      0.1337E-07      0.3380E-02
0.3927E+02      0.2935E+00      0.5325E+04      0.2029E-07      0.4198E-02
0.4273E+02      0.3031E+00      0.3677E+04      0.4693E-07      0.6489E-02
0.4527E+02      0.3095E+00      0.2905E+04      0.7996E-07      0.8558E-02
0.4873E+02      0.3171E+00      0.2204E+04      0.1494E-06      0.1184E-01
0.5211E+02      0.3216E+00      0.1872E+04      0.2163E-06      0.1435E-01
0.5789E+02      0.3266E+00      0.1574E+04      0.3202E-06      0.1759E-01
0.6211E+02      0.3294E+00      0.1424E+04      0.4017E-06      0.1979E-01
0.6789E+02      0.3324E+00      0.1286E+04      0.5056E-06      0.2230E-01
0.7211E+02      0.3341E+00      0.1213E+04      0.5777E-06      0.2390E-01
0.7789E+02      0.3359E+00      0.1143E+04      0.6610E-06      0.2563E-01
0.8211E+02      0.3369E+00      0.1104E+04      0.7149E-06      0.2670E-01
0.8789E+02      0.3379E+00      0.1065E+04      0.7742E-06      0.2783E-01
0.9211E+02      0.3385E+00      0.1044E+04      0.8107E-06      0.2850E-01
0.9789E+02      0.3391E+00      0.1023E+04      0.8487E-06      0.2919E-01
0.1021E+03      0.3395E+00      0.1012E+04      0.8698E-06      0.2956E-01
0.1079E+03      0.3397E+00      0.1003E+04      0.8886E-06      0.2989E-01
0.1121E+03      0.3398E+00      0.9991E+03      0.8955E-06      0.3001E-01
0.1179E+03      0.3398E+00      0.9991E+03      0.8955E-06      0.3001E-01
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 100      18    2   20    2 60.0
 200      10   10
 300      03    0    0    0
 400   04.0004.0004.0004.0004.0007.0003.0003.0005.0006.0006.0010.0010.0010.0010.0010.00
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3200     1 1.0  0.5
3300         5.13       .32
3400     1 1.0  0.9
3500         5.13       .08
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